GALE & POLDEN'S MILITARY SERIES.

CATECHISM

ON THE

MANUAL OF INSTRUCTION

IN

ARMY SIGNALLING

ETC.

BY

MAJOR L. EDYE,

AND

CAPTAIN E. RHODES, D.S.O.

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PREFACE.

In the publication of this Catechism, divided into two parts, the former exclusively on the Manual, the latter containing questions arising from experience acquired in the field during the Campaigns of 1882-85-86, and from other sources, the Authors are prompted by no desire to claim originality for their work, but rather a wish to facilitate the study of a subject still in its infancy, but eminently necessary to the welfare of an army in the Field.

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Late Director of Army Signalling Egyptian Frontier Field Force.

May, 1889.

Q. Is disobedience of a signalled order punishable by military law?

A. Yes; Section 9, Army Act, 1881, states:—
"Every person subject to military law who "commits the following offence, that is to say, "disobeys in such a manner as to show a wilful "defiance of authority, any lawful command "given personally by his superior officer in the "execution of his office, whether the same "is given orally, or in writing, or by signal, "or otherwise, shall, on conviction by court-"martial be liable to suffer death or such less "punishment as in this Act mentioned."

PART I.

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PART II.

APPENDIX.

QUESTIONS ON THE PREFACE TO MANUAL OF INSTRUCTION IN ARMY SIGNALLING.

Q. How are commanding officers to further the advancement of army signalling?

A. By giving every facility for carrying on the instruction of regimental signallers, and keeping up their efficiency by constant practice.

Q. Who is responsible that a corps has its proper complement of signallers and supernumeraries according to Queen's Regulations?

A. The commanding officer.

Q. With what understanding are signal officers and men to undertake the duty of army signalling?

A. A full appreciation of the importance of a thorough knowledge of it, in all its branches, and the labour and study required to acquire, and keep it up.

Q. Is a course of instruction alone sufficient to qualify officers and men to bear the important responsibility which rests upon them, as signallers to an army in the field.

A. No, it affords them a knowledge of the rudiments of the art, but it is only by practice, under all the possible situations that might occur in actual warfare, that they become fitted for the field.

Q. Why is it important for signallers, in time of peace

to discover the distances and limits within which signalling can be satisfactorily employed with different instruments?

A. So that the chances of failure in the field may be reduced to a minimum.

Q. Is any deviation to be made from the principles and rules given in the manual, or are any unauthorised practises to be introduced?

A. No.

CATECHISM

ON

ARMY SIGNALLING.

THE CHANGES IN MANUAL FOR 1888 ARE SHEWN IN (*italics*.

I.—INTRODUCTION.

Q. What means are adopted in the army for conveying orders and intelligence?

A. The electric telegraph, visual signalling, and mounted orderlies.

Q. Are these methods of communication dependent on one another?

A. No, if one channel breaks down, or is not adapted to the particular circumstances, another takes its place.

Q. What are the advantages and disadvantages of the electric telegraph?

A. It is the most rapid and accurate means of communication between fixed points, but takes time to lay down and take up, and in a hostile country must be guarded along its entire length, and therefore is only used within the outpost of an army.

Q. What are the advantages of visual signalling?

A. In clear weather it is a rapid and accurate method of communication; requires little transport and can be used in difficult countries where there are no roads; possesses great mobility, and offers few points of attack to the enemy.

Q. Where may visual signalling be most advantageously used ?

A. In the more advanced positions of an army, and in hilly countries with unfriendly inhabitants.

Q. May visual signalling be employed between separate bodies of an army at rest for a definite period ?

A. Yes, it is especially useful when the electric telegraph is unavailable, and can be used when necessary to supplement it.

Q. Mention some instances when visual signalling is used?

A. Between outposts and the main body of an advanced guard; between detached posts hastily occupied; between important points in a defensive position where divisional commanders communicate with the commander-in-chief up to the time of battle; between ships and the shore, and between permanent stations such as harbour forts.

Q. Which is the most accurate way of transmitting intelligence ?

A. By means of an orderly with a written message.

Q. By what is the use of an orderly with a written message restricted ?

A. The time occupied and the increase of the unit (*viz.*, a man and horse), for every message and stage in the distance.

Q. When should mounted orderlies be used ?

A. For short distances, *e.g.*, between troops in motion in the field, and between points where there exist no other means of communication, *e.g.*, by a reconnoitring party to convey intelligence to the nearest signal station.

Q. Are messages to be signalled, to be verbal or in writing ?

A. In writing.

Q. Is it the duty of a signal party to collect information ?

A. No, its duty is to convey intelligence, not collect it.

Q. How are messages worded?

A. As concisely as possible, all unnecessary words being avoided.

Q. Why is signalling so important a branch of military training?

A. Because any method which conveys intelligence accurately, quietly, and quickly, from the outposts to the head-quarters of an army, is of incalculable advantage, on account of the information it affords and consequent suppression of false alarms, etc.

Q. Is time a factor of value in army signalling?

A. Yes, a gain of even a few minutes in informing a General of the movements of an enemy may decide the fate of an engagement.

Q. Should it be the object of all officers to insure the efficiency of signalling, whether personally engaged in it or not?

A. Certainly.

II.—PRINCIPLES OF VISUAL SIGNALLING.

DOTS AND DASHES.

Q. Of what elements is the system of visual signalling composed, and how is the alphabet expressed by them?

A. The dot and dash, these combined in groups forming the alphabet.

Q. What are the values of the different elements and their intervals?

A. The dot is taken as the unit, and the dash is equal in time to three dots.

Q. To what is the pause between each complete sign or letter equal?

A. Three units.

Q. To what is the pause between words equal?

A. **Six units.**

Q. On what does good signalling depend?

A. That the correct lengths of dots, dashes, separating intervals, and pauses, are properly maintained.

Q. Whatever may be the rate of sending, what is indispensable with regard to time?

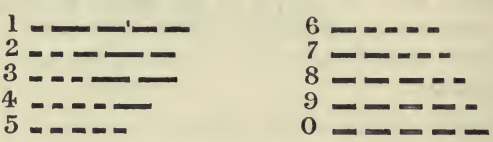
A. That the relative lengths of the elements, intervals, and pauses be rigidly adhered to.

Q. What alphabet is in use for signalling, and on what principle is it constructed?

A. The Morse, so constructed that letters of most frequent occurrence have the shortest symbols, no letter requiring more than four elements.

Q. *What are the numeral signs adopted for the first time in Army Signalling?*

A.



(*p. 5*)

Q. What is the only mark of punctuation in use in army signalling?

A. The full stop *viz.*, -- -- -- **I I I**.

Q. Of what does the preparative and erasure signal consist?

A. A continued succession of dots.

Q. When is the preparative sign used?

A. In calling the attention of two or more stations in sight before sending a message.

Q. How does a receiving station acknowledge the preparative sign?

A. It gives and repeats its distinguishing letter, or letters without the prefix **P**, till the next signal is begun.

Q. *When is the general answer used as an acknowledgment?*

A. *At all other times* (*p.* 5)

Q. When is the erasure sign used and how should it be answered ?

A. When a word or group has been wrongly sent, it is answered from the receiving station by the erasure.

Q. What is the stop signal and when is it used ?

A. A continued succession of dashes : when sending to two or more stations it is used to denote the end of the message that the preparative sign has commenced.

Q. What is the general answer ?

A. A **T**, or dash.

Q. What is the repeat signal and how is it made ?

A. - - — — - - (sometimes called **I M I**, made continuously, and not as three letters.)

Q. By what is the repeat signal immediately followed ?

A. By the word or words wanted.

Q. What is the signaller's indicator and when is it sent and used ?

A. - — - —**A A**, it is sent at the commencement and conclusion of signaller's directions to each other and when a message has been commenced, to show what follows has nothing to do with the message itself.

Q. *How is the signaller's indicator answered ?*

A. *It is answered by the indicator.* (*p.* 6.)

Q. Of what do the directions preceded by the signaller's indicator mainly consist ?

A. Instructions concerning readiness to signal ; the colour of the flag to be used ; position to be occupied ; condition of light, etc.

Q. What is the cipher sign and when is it used ?

A. — - — - — - —**C C**, used before and after cipher groups.

Q. *How are the cipher signs answered ?*

A. *By the general answer.* (*p.* 6).

Q. What is the break signal, when is it always used?

A. -- -- **I I**, between the address and text of a message.

Q. If the name and address of the sender or "addressor" of a message are to be signalled, when are they sent and how are they distinguished from the text of a message?

A. After the text and separated from it by the break signal.

Q. What signal denotes the completion of a message, and how is it sent?

A. ---—- **V E**, sent continuously not as two letters.

Q. What is the obliterator used for, and how does it differ from the erasure signal?

A. -—-—-—- **W W**, it erases everything in the message that has been signalled; the erasure signal only erases a word or group that has just been wrongly sent.

Q. How is the obliterator acknowledged?

A. By the obliterator.

Q. *What signal is sent to indicate figures are intended?*

A. ---—--- *or* *F I.* (*p.* 6.)

Q. *What signal is used indicating figures are finished?*

A. ---—- ---—- *or* *F F.* (*p.* 6.)

Q. *How should these two signals when used before and after figures be acknowledged?*

A. *By the general answer.* (*p.* 6.)

III.—APPARATUS AND METHOD OF USING IT.

FLAGS.

Q. Why are the short and long flashes represented by means of the motion of the flag instead of its appearance or obscuration?

A. From the fact that although the flag is visible when stationary it is only fully exposed when in motion.

Q. In what positions may a signaller work the flag?

A. From left to right or *vice versa*, or he may turn his back upon the station to which he is signalling.

Q. How is the flag waved with regard to the wind?

A. From the normal position against the wind.

Q. How is a class fallen in with large flags?

A. Either in single rank, six paces apart, or in two or three ranks at proper intervals, the flag pole held across the body pointing upwards to the left, right hand to grasp the pole eight inches below the flag, which will be gathered in and held in the left hand.

Q. What happens on the command "Prepare to Signal"?

A. Carry off the right foot twelve inches to the right, raise the pole with the right hand until in a line with the left shoulder, seize the butt of the pole with the left hand opposite the centre of the body, left elbow close to the side, left forearm square, wrist rounded outwards and six inches in front of the centre of the body, right hand about eight inches below the flag, but without constraint; the pole when in the normal position to make an angle of twenty-five degrees with a vertical line through the centre of the body, and held at such a height that when the flag is in motion the signaller can see underneath it.

Q. How is a dot made?

A. The flag is waved from the normal position to a corresponding position on the opposite side of the body, *i.e.*, through an arc of fifty degrees, and back again to the normal position.

Q. In making a dot what three things should be observed?

A. That the arc described by the flag is not more or less than fifty degrees, that it is made without pause, and that the left elbow is kept close to the side.

Q. What points are to be attended to when making a dash ?

A. That the flag be waved from the normal position through such an arc that the pole nearly touches the ground, that the left elbow is close to the side and right arm straightened, and that a short but distinct pause is made when at the lowered position.

Q. What should be the essential position of the right arm in order to mark the dash properly and how is a class taught to acquire this position ?

A. The arm should be straightened and well lowered ; and the class practised in making a succession of dashes, the right hand alone grasping the pole, the left hand being held behind the back.

Q. When signalling a letter with a flag, what particular care should be taken with regard to connecting its elements ?

A. That the flashes representing them are in one continuous wave and that no pause is made at the normal position during the formation of the letter.

Q. What is the length of the pause made between each letter of a word or group and at what position of the flag is it made ?

A. A pause equal to the length of a dash, made at the normal position of the flag.

Q. What is done with the flag pole and flag on the completion of a word or group ?

A. The flag pole is lowered and the flag gathered in with the left hand.

Q. When only is a pause made at the normal position ?

A. Before commencing a word or group.

Q. When receiving a message and during the time he is not answering, how should the signaller hold the flag.

A. Lowered and gathered in.

Q. While moving it across the body how should the flag be worked so as always to be exposed ?

A. In such a manner that the point of the flag pole describes an elongated figure of eight in the air; it should never be allowed to droop to the front and the flag pole should be kept as upright as possible.

Q. While signalling, when should the upright position of the pole be especially attended to?

A. After making a dash.

Q. In forming dashes, especially when two or more come together in a letter, what should the signaller be most careful to observe?

A. That the flag is brought back to the normal position between each dash.

Q. Why is it so important to bring the flag back to its normal position when two or more dashes in a letter succeed one another?

A. Because, unless this is done the idea of time is destroyed, without which it is impossible either to send or read correctly.

Q. Why is a flagman when signalling to a Station to stand square with it?

A. In order that the flag may be at right angles to the visual line between the two stations.

Q. How many sizes of flags are there?

A. Two; the large and small flag.

Q. Describe, and give the dimensions of the large flag and pole?

A. Three feet square, made of a sort of muslin, of two colours, white with blue strip for dark background, and dark blue for light background; the pole is 5 feet 6 inches long, 1 inch diameter at butt, tapering to ½ inch at top.

Q. Describe and give the dimensions of the small flag and pole?

A. Two feet square, made of a sort of muslin, of two colours, white with a blue strip, for dark background, dark blue for use with a white background,

the pole is 3 feet 6 inches long, $\frac{3}{4}$ inch diameter at butt, tapering to $\frac{1}{2}$ inch at top.

Q. What difference is there in the drill with the small flag compared with that of the large one?

A. The hands are held higher *and closer together* (*p.* 10.) arms nearly straight, left hand not lower than the chin, elbows not to rest against the chest.

Q. What precaution should be taken when using the small flag in order that it may be distinctly seen at a distance and what advantage is thereby derived?

A. That it is waved through a wide circle and well clear of the head thus often saving the labour of using the larger flag.

Q. With clear sending and under favourable conditions how far can the large flag be read?

A. With the service telescope up to 12 miles.

THE HELIOGRAPH.

Q. What is a heliograph?

A. An instrument for directing the reflected rays of the sun, alternately on and off a distant station by means of a movable mirror.

Q. How is the mirror of the heliograph mounted?

A. With trunnions on U-frame fixed to a plate, moving horizontally on another plate, fixed to a tripod stand.

Q. How is the horizontal and vertical motion communicated to the mirror to enable it to reflect the sun?

A. A tangent endless screw working between the plate that carries the U-frame and the plate fixed to the tripod stand gives it the necessary horizontal motion, whilst a vertical screw-rod at the back of the mirror regulates the inclination.

Q. How can the reflected rays from the sun be kept stationary on any point?

A. By an adjustment as required to the tangent screw and key attached to the vertical rod.

Q. How are signals made with the heliograph ?

A. The vertical rod is pressed down against a spring by means of a key, and after a short or long pause released, thus throwing a dot or dash of light on or off the distant station.

Q. What are the names given to the various parts of a heliograph ?

A. Tripod with cap, signalling mirror, U-frame for mirror, tangent box, tangent screw, lever arm and spring, capstan-headed screw, key, vertical rod, screw for clamping the rod, jointed arm, clamping screws for arm at hinge and either end, sighting rod and sighting vane with sighting spot and cross lines all contained in leather case.

Q. How is the hinge in the centre of the jointed arm secured in the latest pattern of heliograph ?

A. By a spring gun clip.

Q. *Describe the heliograph tripod ?*

A. *It consists of three mahogany legs, which close into each other, united at the top, by a brass head provided with a screw for receiving the heliograph and lime-light.*

The threads of the screw when the tripod is not in use are protected by a cap which is attached to one of the legs by a brass chain, (*p. 12.*)

Q. Name the parts of a duplex mirror ?

A. Duplex mirror with sighting spot, U frame and clamping screw.

Q. How should a heliograph be laid when it faces the sun ?

A. By means of a sighting vane a few inches in front of the mirror, connected with the jointed arm of the heliograph by a rod.

Q. How should a signaller place himself with regard to the distant station and mirror, in order to adjust the vane, what process does he go through ?

A. Opposite to the mirror, with his back to the station he desires to communicate with, he moves his head

and eye until he sees the distant station reflected in the centre of the mirror, then without any movement of the head adjusts the sighting vane so that the reflection of the sighting spot is brought accurately in line with the centre of the mirror and the reflection of the distant station.

Q. *What should a signaller in adjusting his heliograph on an object, be most careful to avoid?*

A. *The error of selecting a false shadow spot which may be occasioned by a stain on the signalling mirror.* (*p.12*)

Q. How are the centre of the two mirrors indicated?

A. The centre of the duplex mirror by a spot on the paper vane; and that of the signalling mirror by an unsilvered spot or circle.

Q. When the reflection of the sighting spot, centre of mirror, and distant station are aligned, will moving the direction or inclination of the mirror alter the alignment?

A. No, only the sun reflection.

Q. After aligning the reflection of the sighting spot centre of mirror, and distant station, what remains to be done to open communication?

A. The signaller from behind the instrument will direct the reflection of the sun on to the vane by moving the mirror.

Q, How is the mirror moved if little alteration is required in its horizontal or vertical position?

A. In the former case by turning the tangent screw; in the latter by means of the key.

Q. How may considerable vertical alteration be given to the mirror?

A. By releasing the screw clamping the vertical rod, thereby causing it to move freely in its socket, and by clamping and making accurate adjustment with the key, when approximately correct.

Q. How may considerable horizontal alteration be given to the mirror?

A. By putting the tangent screw out of gear; and by pressing it back with the forefinger of the left hand, the left thumb being pressed tightly against the back of the tangent box, the right hand holding the right arm of the U-frame *which must be held by the thumb and forefinger* (*p.*13.)

Q. Why should the signaller be careful to hold the screw firmly back when making considerable horizontal alteration in the position of the mirror ?

A. To avoid injury to the teeth of the tangent screw.

Q. Describe the sighting vane.

A. It is a piece of white metal on one side of which is a black spot and on the reverse side an inverted **T**.

Q. What is the shadow spot ?

A. A disc of shadow that the unsilvered circle in the centre of the mirror projects in the centre of the light reflected from the mirror.

Q. What is the sighting spot and for what purpose is it used ?

A. It is either a black spot, or the junction of the horizontal and vertical black lines forming an inverted **T**, it is used in the alignment of the heliograph, and fixes the position of the shadow spot when the key is depressed.

Q. How is the shadow spot kept adjusted to the sighting spot so as to follow the apparent motion of the sun ?

A. By a constant adjustment as required of the mirror, by means of the two slow motion screws, *i.e.*, the key and tangent screw.

Q. Why should the signaller while sending, keep his eyes fixed on the sighting vane ?

A. To see that he is keeping the shadow spot continually in the same relative position below the sighting spot on the vane, so that whenever he depresses the key, the shadow spot may strike the sighting spot.

Q. Define the beat of the heliograph and how may it be regulated.

A. It is the play of the mirror, or difference in elevation between the two positions of the shadow spot on the vane when the key is depressed or released alternately; the amount of difference being regulated by the capstan headed screw which controls the lever arm.

Q. What care must be taken with regard to the relative positions of the shadow and sighting spots on the vane?

A. That the beat is just sufficiently long enough to prevent the distant station from seeing the light when the key is released.

Q. What are the disadvantages of working with too long or too short a beat?

A. With the former the instrument is shaken and the letters take longer to form; with the latter the light remains on the distant station even when the key is released.

Q. Why is the smallest possible play given to the mirror sufficient to throw it off and on a station, especially a distant one?

A. Because by a law of optics the reflected beam moves through twice the angle passed over by the mirror.

Q. If it is inconvenient for the signaller to align the vane from the front of the mirror what alternate method may he adopt?

A. That of aligning the vane by looking through the hole in the centre of the mirror.

Q. *Whilst using the heliograph where should the case be put?*

A. *Either placed under the instrument, or else hung over the tripod.* (*p. 14.*)

Q. What course does the signaller pursue when the sun is behind him or the reflection of the single mirror is not sufficiently full?

A. He uses the second mirror, with the paper vane and sighting spot, gummed on its centre.

Q. Describe how the signaller lays the heliograph when the duplex mirror is used instead of the sighting vane.

A. He places the signalling mirror roughly facing the sun, substitutes duplex mirror for sighting vane, turning the latter towards the distant station; next, standing behind the duplex mirror he looks into the signalling mirror and moves his head till he gets the centre of the two mirrors in a line with his eye, then without moving his head adjusts the direction and inclination of the duplex mirror until the reflection of the distant station coincides with the mirror's centres, clamps duplex mirror in this position, shifts his position to the back of the signalling mirror and turns the flash from it on to the paper vane on the duplex.

Q. When the duplex mirror is used, what special care should the signaller take with regard to it?

A. That it is securely clamped, and that its position is not altered while communication is kept up.

Q. How can the duplex mirror be adjusted from behind the signalling mirror?

A. By looking through the hole in the centre of the signalling mirror, and making the reflection of the distant station coincide with the sighting spot on the paper vane.

Q. In setting up a heliograph, what precaution should be taken to ensure the steadiness of the tripod?

A. That the legs, if possible, are pressed firmly into the ground.

Q. When a wind is blowing strongly, what further arrangment gives steadiness to it?

A. A sandbag or other weight suspended to the hook between the tops of the legs of the tripod, the

weight just touching the ground to prevent its swinging.

Q. What method may be adopted to give still greater stability to the heliograph ?

A. A hole is bored in the ground under the centre of the heliograph, just large enough to receive a piece of wood about 4 inches long with string or wire attached, the soil is then rammed over the hole and the string lashed firmly to the hook of the tripod.

Q. What precaution should be taken to prevent the heliograph being damaged in transit ?

A. That it is properly packed in its case.

Q. What care must be taken with regard to the position of the signalling mirror and vertical rod before the heliograph is placed in its case ?

A. That the signalling mirror is flush with its U-frame, and that the vertical rod does not project beyond the ball through which it works.

Q. What is done to the jointed arm and large clamping screw prior to replacing the heliograph in its case ?

A. The jointed arm is turned round to the right rear of the mirror and doubled up so as to be between the back of the mirror and vertical rod ; the large clamping screw being slightly clamped and turned level.

Q. How is the duplex mirror placed in the pocket of the case provided for it; in what position must its clamping screw be ?

A. With its face towards the padded partition, its clamping screw being level with the mirror.

Q. *What precaution should be observed in packing the heliograph ?*

A. *That the case when packed shows a perfectly flat surface without any apparent bulge* (*p* 16).

THE HELIOSTAT.

Q. What is a heliostat and how are signals made with it ?

A. An instrument having a motion similar to the heliograph in order to follow the sun; signals are made with it by means of a shutter which intercepts the reflected light.

COLLAPSING DRUM.

Q. When and under what circumstances may a collapsing drum be chiefly used?

A. By day between ships and the shore.

Q. How high should a collapsing drum be hoisted above deck or ground, and how is it extended?

A. 15 to 20 feet; it is self collapsing, and is extended by hand.

Q. Why may a collapsing drum be advantageously used at a central station?

A. Because it can be seen from all directions.

SHUTTER APPARATUS.

Q. Is there any fixed size for the shutter apparatus?

A. No, it may be made of any size.

Q. How far is a shutter of 72 feet surface visible in clear weather?

A. 10 to 15 miles.

Q. Describe the shutter apparatus and its mode of action?

A. It consists of a series of shutters, working on a pivot so constructed as to move simultaneously by the motion of a handle; when the shutters lie horizontal they represent the obscuration of the object and nothing is seen, but when the shutters lie vertical, representing the appearance of the object a large surface comes into view.

Q. How is the face of a shutter apparatus and its frame painted, when used with different backgrounds?

A. If used against a dark back-ground, the face is painted white or whitewashed, and frame black;

against sky or light background the shutter is black and frame white.

LIME LIGHT.

Q. How is lime light derived?

A. From a pencil of lime raised to a white heat by means of an oxy-hydrogen flame.

Q. How is the oxy-hydrogen flame obtained?

A. By causing a jet of oxygen gas to pass through the flame of a spirit lamp on to the end of a lime pencil.

Q. Of what parts does the lime light apparatus consist?

A. Body of lamp; obscuring disc with key; spirit chamber; pencil-holder; tripod; gas and pressure bags; gas tubing.

Q. Of what does the lens arrangement of the lime light consist, and how is it connected with the body of the lamp?

A. Two plano-convex lenses, each three inches in diameter, placed about half an inch apart, convex surfaces towards one another, plane surfaces outwards, so that it is immaterial which end of the tube or carriage in which the lenses are fixed, is screwed into the opening in the body of the lamp.

Q. How is the lime pencil held, and where is the opening for it in the lamp?

A. By a metal claw, inserted through a hole in the back of the lamp.

Q. What other parts does the body of the lamp possess besides the opening for the lens arrangement and pencil holder?

A. A perforated cap, hinged door, and handle.

Q. Describe the obscuring disc and key of the lime light apparatus and their working?

A. Between the light and lens is a metal disc raised or lowered to expose or shut off the light as occassion may require, by means of a key on the outside of

the lamp; the key is covered with ivory or other non-conductor of heat, and is acted on by a spring outside the lamp which keeps the disc in the obscuring position.

Q. Describe the spirit chamber and how the body of the lamp is secured to it?

A. The spirit chamber has a burner in the middle for cotton or sponge wick, and is attached to the body of the lamp by means of two pins connected to chains.

Q. What is fixed along the top of the spirit chamber, and on it respectively?

A. A conducting pipe for the gas, terminating in a nozzle projecting into the spirit flame, and on the spirit chamber a sighting rod.

Q. How is the body of the lime light lamp supported?

A. On a tripod similar to that of the heliograph.

Q Describe the gas bag of the lime light apparatus.

A. It is made of a waterproof material capable of containing about *three and a quarter* (*p. 20*) cubic feet of oxygen gas, having a tap and nozzle to which the tubing is attached.

Q. What weight of sand or earth is put into the canvas pressure bag, and when?

A. From 12 to 14 lbs., just before using it.

Q. What connects the gas bag tap with the conducting pipe passing outside the spirit chamber?

A. An elastic indiarubber tube.

Q. How is the supply of gas to the burner regulated, and what is the object of the pressure bag?

A. When required, the tap of the gas bag is turned on full and the gas regulated by a tap on the conducting pipe just above the nozzle which receives the tubing; the pressure bag causing the dimensions of the gas jet playing on the lime pencil to remain more or less uniform until the gas bag is exhausted.

Q. What should be done to the lime pencil when signalling is completed?

A. Removed from the holder.

OXYGEN GAS.

Q. From what mixture, mentioning its proportion is oxygen gas for the lime light prepared?

A. Chlorate of potash, three parts; granulated binoxide of manganese, one part.

Q. Why is granulated binoxide of manganese used in the mixture from which the oxygen gas is obtained?

A. Because it facilitates the decomposition of the chlorate of potash.

Q. What care should be taken as regards the retort and mixture of the ingredients for making oxygen gas?

A. That the retort is dry, and the potash and manganese well mixed.

Q. What sort of a fire should be used for making gas?

A. The fire should be *a slow one* made of wood, not coal which injures the retort.
On no account should a fierce fire be used (p. 20.)

Q. Describe how the gas for the lime light is made.

A. Put one lb. or about two-thirds of a pint of the mixture, as described, in the retort and screw cap tightly home; open tap of gas bag and fill wash bottle half full of cold water, connecting it by elastic tube, at the place marked "out;" attach separate tubing to part of wash bottle marked "in;" holding tubing in the hand, place retort on the fire, and connect wash bottle by tube to retort directly gas begins to come.

Q. How may it be determined whether the retort is giving off gas or steam?

A. By holding a piece of glowing wood to the tube of the retort, when if oxygen is passing a brilliant flame results.

Q. Previous to use what is done to the tubing and wash bottle?

A. Blown through to make sure that all is clear.

Q. If gas comes too freely from the retort what is done to the latter?

A. It should be taken off the fire, placed in a warm position near it, and replaced when necessary.

Q. What quantity of the mixture for making gas should be put into the retort at a time, and how many bags should it fill?

A. Not more than one lb. or two-thirds of a pint; the gas from which should fill two bags.

Q. When the retort has been removed from the fire and cooled, how is it prepared for future use?

A. By being washed out with water and placed on the fire to dry.

Q. Why, if the retort is a copper one, is the fire to be made of wood and not coal?

A. Because a fire made of the latter material will injure it.

TO TRIM THE LAMP.

Q. Describe the wick of the lime light lamp; how is it cut and inserted in the holder?

A. It is a cotton wick about 7 inches long, and thick enough to well fill the holder, *without packing it too tightly* (*p. 21.*) the strands are laid carefully together and inserted in the latter without being twisted. The wick should be carefully cut flush with the top of the holder, but with a few strands left projecting one eighth of an inch just where the gas pipe enters the holder.

Q. After cutting the wick, how should the gas pipe be refixed and the strands arranged?

A. The nozzle of the gas pipe should be bedded in the projecting strands of the wick, those in front of the nozzle being pressed right and left so as to

form a channel for the free passage of the jet of gas on to the end of the lime pencil.

Q. Why must great care be taken to make a channel in the projecting strands of the wick to the lime light lamp?

A. Because any obstruction of the jet of gas, or any excess of flame mars the light.

Q. With what is the chamber of the lime light lamp filled?

A. Spirits of wine.

Q. How should the oxygen jet point, when the body of the lime light lamp be replaced on the spirit chamber?

A. Towards the lime pencil holder.

TO OBTAIN THE LIGHT.

Q. Describe briefly the means of procedure for obtaining the lime light?

A. Light spirit lamp, placing lime *pencil* in holder, put it in position and heat for a short time in spirit flame; connect with tubing, gas bag and conducting pipe in front of spirit chamber, place pressure bag on gas bag, open tap of latter, turn on tap of lamp and adjust lime *pencil* (*p. 22.*)

Q. How long should the lime pencil be, and how should it be cut or rubbed?

A. A length of about one inch is placed in the holder with the end on which the gas jet is to play, cut or rubbed flat at right angles to the longer axis of the pencil.

Q. Describe how the lime pencil is adjusted with reference to the jet of gas?

A. By moving the holder containing the pencil backwards and forwards with a twisting motion until the jet of gas regulated by the oxygen tap, impinges on the end of it and raises it to an intense white heat.

Q. Upon what does the intensity of the lime light depend?

A. On the exact proportion of the two gases in the flame, being brought to bear on, and completely covering the end of the centre of the face of the pencil.

Q. By what guide in making this adjustment of the lime pencil and flame, should the signaller be governed?

A. Its reflected image in the lens.

Q. What fault gives rise to a dark pencil end?

A. Either the pencil is too far back for the jet of gas to strike it; there is not enough gas turned on; or the pencil is too far forward and the gas strikes the bottom of it.

Q. What are the causes of a dark spot in the middle of a bright pencil?

A. Either the pencil is too far forward, or there is too much gas.

Q. What is the cause of the upper part of the pencil being too dark and the lower part of it too bright, or *vice versâ?*

A. In the former case the pencil is too far forward, in the latter not forward enough.

Q. If it is found impossible to get a good light by any adjustment of the pencil, or supply of oxygen gas, where does the fault probably lie?

A. Either from the supply of hydrogen from the spirit flame being too much or too little, that is, the wick being too high or too low, or that there is too much flame in the lamp.

Q. When everything is in order how far in rear of the centre of the wick should the end of the pencil be, and what aspect should its reflected image present when seen through the inspection hole?

A. About one-tenth of an inch; the reflected image should present the appearance of a disc of bright

light of uniform intensity without shadow or spot over it.

Q. How is the lens focused in order that the greatest possible amount of light reaches the distant station?

A. By placing any object about 18 feet in front of the lamp, and adjusting the focus until the smallest circle of light is obtained.

Q. What diameter of focus circle does the lime light lamp give at 18 feet distance?

A. About 18 inches.

Q. Why is the signaller not to tamper with the gas pipe of the lime light?

A. Because it has been bored and bent so as to throw the jet of gas on the centre of the pencil; so great is the nicety required in this case that the adjustment should be tested before the issue of the lamp.

Q. Why must constant attention be paid to the lime pencil while signalling?

A. To see that it is in a proper position with relation to that of the oxygen jet, and that it is not cracking, in which case, it must be at once replaced by a new pencil.

Q. When signalling with the lime light, what care must be taken as regards the supply of gas and the direction in which the lamp is turned?

A. That the supply of gas be regulated and economised, and the lamp always kept on the receiving station.

Q. When communication with a distant station has ceased, what precaution should a signaller at once take?

A. That the tap of the lamp be turned off and the pressure bag removed.

Q. How is the alignment of the lime light on a station obtained?

A. By means of the sighting tube, *or pickets* (*p.* 24.)

Q. If it be required to resume work what precaution

should be taken before the tap at the lamp is turned on?

A. To place the pressure bag on the gas bag.

Q. What is the range of the lime light in England?

A. It exceeds 20 miles.

Q. When practicable how is the direction of a distant station fixed by day?

A. By pickets, their tops being in a line between the proposed position of the lamp at night, and distant station.

Q. How does the signaller with the aid of the sighting tube align the lime light correctly on the distant station?

A. He looks through the pin-hole at the rear end and turns the lamp until the distant light is brought fully into the field of the tube.

THE HAND LAMP

Q. Describe the hand lamp and its source of light?

A. It is an ordinary bullseye provided with a disc, having a key on the outside which opens or obscures the light originating from a flat, double, $1\frac{1}{2}$ inch wick.

Q. What oil is used with the hand lamp?

A. Colza or other vegetable oil, no mineral oil being allowed.

Q. How is the wick of the hand lamp placed?

A. With its edge turned towards the bullseye.

Q. What care must be taken with regard to the supply of air to the hand lamp?

A. That the air holes at the bottom of the lamp are kept clear.

Q. *Describe the stands for lamp?*

A. *It consists of a tripod the legs of which fit into each other, having a metal knob with studs which fit into the base of the lamp* (*p.* 25).

TELESCOPE.

Q. With respect to field glasses and telescopes what further is required of signallers besides a thorough knowledge of how to use them ?

A. That they be able to clean the lenses and replace them in their proper positions.

Q. Of what does the portion of the telescope that forms the eyepiece consist ?

A. An object glass, a diaphragm, an amplifying lens, a field lens, another diaphragm and an eye lens.

Q. Of what does the object glass of the telescope consist?

A. Two lenses ; one a thin double convex, the other a thicker plano-concave lens, one convex surface of the former fitting into the concave surface of the latter.

Q. What care must be taken in replacing the lenses of the object glass of the telescope ?

A. That the thicker one has its plane or flat surface towards the eye, and the thin lens is outside towards the object.

FIELD GLASS.

Q. Of what does the arrangements of lenses in the field glass consist ?

A. An object glass, diaphragm, and eyepiece.

Q. In replacing the object glass of the telescope or field glass, in what direction should the curved side be turned ?

A. From the eye and towards the object to be viewed.

Q. With what should the lenses be cleaned, and how often should they be removed from their tubes ?

A. Chamois leather or blotting paper ; and removed as seldom as possible.

Q. Should the interiors of the tubes of telescopes and field glasses be cleaned ?

A. No they are purposely blackened.

Q. How should a telescope be opened and shut?

A. The tubes should be slightly twisted and not drawn out or shut in straight.

SIGNALLING BY SOUND.

Q. With what instruments are sound signals made?

A. Bugles, foghorns, steam whistles, etc.

Q. In what two ways may the dots and dashes be represented when using sound signals, on an instrument with one or two notes?

A. By making a high note representing a dot, a low one a dash, or when using one note, carefully preserving the time.

IV.—COURSE OF INSTRUCTION.

TIME.

Q. What is the first essential qualification of a signaller?

A. That he should be able to read the Morse Alphabet on any of the apparatus in use as easily as though he heard the letters called out to him.

Q. Why cannot a signaller be relied on in the field if he is unable to read accurately and without effort signals on the practice ground?

A. Because on the latter there are none of those difficulties and distractions inseparable from signalling in the field.

Q. Though the form in which the letters of the Morse Alphabet are represented to the reader varies in the different instruments, what underlying idea remains unchanged?

A. That of time, the dots and dashes of the Morse Alphabet representing certain periods of it.

Q. Why must the idea of time be first imparted to the

learner of signalling under different forms, that is, on various instruments?

A. In order that he may not find himself hampered when passing from one instrument to another, which would be the case if he first learnt the alphabet under one particular external form.

Q. In what three ways are the forms under which letters are represented by the different apparatus; give examples?

A. The appearance or disappearance of an object, as with the lamp, shutter, etc., the motion of an object, as the flag; and the sound of an instrument, as the foghorn, etc.

Q. Why is it indispensable that men should be taught to read by time, instead of position, taking for an example a signaller waving a flag, where the skyline cuts him above the waist?

A. During the dash, the flag disappears, if then the reader has been accustomed to distinguish the dot and dash by the position the flag in motion takes up, he will be put off his reading; but if he has been taught to recognise the two signs by two intervals of time, he only requires to see the flag start from its normal position and come back again, in order to distinguish the signs made.

Q. Through what organ only, with most men, is the idea of time perfectly acquired?

A. The ear.

Q. How, and with what instrument are the letters of the alphabet to be first of all represented to the learner?

A. By means of sounds marking long and short intervals of time, made with a dummy key.

Q. What is the principle of the dummy key?

A. That of the single current key used in telegraphy.

LEARNING THE ALPHABET.

Q. What standard of efficiency is each man to reach in

reading and sending, in the first part of the course of a class under instruction in signalling?

A. He must be able to read and send the alphabet perfectly, at the rate of at least nine words a minute, and until this is effected, men should not be allowed to form stations for practice.

Q. In the first part of the course what is the standard for men under instruction, and what is done with those who are unable to reach it?

A. Those men who fail to read and send at the rate of at least nine words a minute are not to be allowed to continue the course.

Q. How many attendances a day, and of what duration should a class under instruction in signalling make?

A. Five attendances, of an hour each day, including one at night.

Q. At the elementary stage of instruction of a class, are the five attendances of an hour a day preferable to a fewer number of longer duration?

A. Yes, the work done will be more satisfactory, when short intervals are allowed between the attendances.

Q. Are the groups of letters sent for imparting knowledge in the alphabet to be without meaning?

A. Yes, the men are not to make use of words until they have acquired literal accuracy in reading.

Q. How are the groups for teaching the alphabet sent, and in what type will the men write them down?

A. They are sent by the instructor with the lamp or dummy key, and should be written down by the men in plain block capitals **A B C** - - - - - -

Q. On the first day of instruction what letters are sufficient to take?

A. The four letters **E I S H**.

Q. Why from the first is each letter sent at or near the standard rate?

A. To accustom the men to read each letter as a whole and not to spell it out in parts.

Q. How are the letters of the alphabet combined for a class under instruction, and how are they sent as regards speed ?

A. In groups increasing from two to six letters or more ; at first a considerable pause between the letters should be made to give men time to think of their meaning, *but at no time should the letters themselves be sent at reduced speed* (*p* 29).

Q. During the latter part of each attendance of a class under instruction in the alphabet, how and where are the letters sent ?

A. On the small flag in the class room and subsequently out of doors.

Q. How is a class when reading the flag out of doors, divided ?

A. Into pairs, one man writing down each letter as called out by the other.

Q. How are men taught to call out the letters they are reading ?

A. Very distinctly and loud enough to be heard by the writer, but without shouting, which tends to indistinctness.

Q. If on the second day of instruction it is found that the letters **E I S H** are thoroughly mastered, how may the instruction proceed ?

A. With the letters **T M O** combined with the other four ?

Q. What care should be taken before teaching fresh letters ?

A. That the men are perfectly at home at reading those previously taught.

Q. In teaching the alphabet in successive stages, how many letters may be added at a time ?

A. Two.

Q. If thought preferable may the alphabet be taught right through from the beginning ?

A. Yes.

Q. What will be the time occupied in learning the alphabet?

A. It will vary considerably with different men, but with a class it will amount to from fifteen to twenty days.

Q. When, and for what purpose is a class under instruction divided into two sections?

A. After the first ten days, so that the more advanced may not be kept back and may have their rate of working pushed on.

Q. Why must there be a fixed rate of communication in the army?

A. In order that the signallers of one regiment may be able to read those of another.

Q. Why is there no restriction put on the speed with which men accustomed to work together signal to each other?

A. Because the higher the rate at which a man reads, the less trouble he has in reading at a lower rate; and he consequently makes out signals under the difficulties of haze, wind, bad back-ground, &c., more easily than a man who is a slower reader.

Q. When may men under instruction be taught to send the letters on the lamp, small flag and heliograph?

A. As they progress in learning to read the letters.

WORDS AND GROUPS.

Q. After the first few days to what equivalent length of message will the groups of letters be made up?

A. To equal the length of a message of twenty short words.

Q. After all the letters are learnt, how may the most convenient messages be made up for practice as well as for testing the rates of working?

A. By test messages composed of three alphabets each.

Q. When men have learnt to send and read accurately at the standard rate, how should they be arranged and drilled?

A. In parties of two or three each, and shown their duties at terminal stations; care being taken they are well drilled to work together.

Q. When the parties of a class under instruction have been well drilled to work as different numbers at terminal stations, how should they be practised?

A. By being separated into pairs of stations beyond the reach of the voice and practised in sending messages consisting of groups of letters between opposite parties, the distance being eventually increased to at least a mile.

Q. At what distance can the small flag be read in ordinary weather with the naked eye?

A. About one mile.

Q. When men are efficient in working between terminal stations, what other description of station and development of station work may they be instructed in?

A. In working at transmitting stations, and subsequently in a chain of stations a mile apart.

Q. At what rate should a man when drilled with the large flag be able to send, and what rate with it should not be exceeded?

A. Nine words a minute; the rate of ten words a minute is not to be exceeded.

Q. *At what rate is a man with the small flag or lamp to be able to send?*

A. *Not exceeding sixteen words a minute* (*p.* 31.)

Q. When the men of a class are efficient in working through a chain of stations a mile apart, what next may they be taught and how practised?

A. The construction and use of the telescope, and in reading the flag at long distances with it.

Q. When men cannot be sent out long distances, how

may they be practised in reading through the telescope at objects having the appearance of being a good way off?

A. With the telescope reversed.

Q. When reading through a telescope, may both eyes be kept open?

A. Yes, if deemed necessary, some men find it less tiring in doing so.

Q. When each man has attained efficiency in working at the different description of stations, and in reading through a telescope, how is the class broken up and exercised?

A. Into parties fully equipped, first working in pairs at distances of two to five miles apart, and finally in a chain of stations at similar distances.

Q. When men are sent out to distant stations what are they taught as regards selecting positions?

A. To choose the most suitable positions and to adapt the principles they have learnt to the variety of ground and background.

Q. Why is instruction in the use of the lamp carried on concurrently with day signalling?

A. So that the alphabet is learnt progressively letter by letter on all kinds of apparatus.

Q. What length of time does a course of instruction occupy?

A. Forty to fifty working days, according to the intelligence of the men.

Q. Is the course to be without interruption?

A. Yes, the men are to be struck off all duties and parades from the day the class is formed.

Q. What *minimum* (*p. 32*) rates of reading correctly from, and sending a test message, form the standard of efficiency with the different instruments?

A. Large flag nine words a minute, small flag twelve, lamp and heliograph ten.

Q. What additional qualifications is a signaller to possess,

besides being efficient with the different instruments and in working stations?

A. He must have a fair knowledge of the manual of instruction, and understand the mode of signalling or sending a service message.

V.—METHOD OF SENDING MESSAGES.

PREFIXES.

Q. What course is taken as regards the order in which messages are despatched when the work is in excess of the capacity of the line?

A. The more important messages are given the precedence.

Q. When may it frequently happen that the work is in excess of the capacity of the line?

A. When signalling in the field, more especially if the heliograph is employed in forwarding messages through a long chain of stations.

Q. How are messages classified according to their relative value?

A. By means of prefixes sent at the commencement of every message.

Q. When only is the use of prefixes obligatory?

A. At fixed or permanent stations.

Q. State in what order a signaller will send the messages in the following cases: 1st—When he has two messages to forward one of which with the higher prefix he received after the other. 2nd—When he finds that a message about to be sent him from another station has a lower prefix than that of a message which he has to send in an opposite direction.

A. In the first case he gives precedence to the message having the higher prefix; in the second case he stops the other station and first sends off the message with the higher prefix.

Q. Besides distinguishing the class to which a message belongs, what also does a prefix indicate?

A. Whether a message is to be delivered at the station to which it is being sent, or whether it is to be transmitted.

Q. What is the object of the signaller at a receiving station knowing at once by the prefix that a message has not to be transmitted?

A. So that he need not call the next station and also that he may take a duplicate copy of the message.

Q. When is it necessary to take a duplicate copy of a message; and how are the two separately dealt with?

A. When the message is for delivery at the station, one copy is reserved as a station record the other sent to the addressee.

Q. How is a duplicate copy of a message taken?

A. By means of a sheet of carbon or black paper, inserted between the leaves of the message book.

Q. What record has a station of a message that has been transmitted through it, and how is it dealt with?

A. The one copy which is filed as soon as it has been transmitted.

Q. What information does the first and second letters of a prefix respectively give?

A. The first indicates whether the message is for transmission or delivery at the receiving station, the second shows of what class or value the message is.

Q. When only do prefixes consist of single letters, and what are those prefixes?

A. When they are private messages; **S** signifying that the message is for delivery at the receiving station, **X** that it has to be transmitted.

Q. When using prefixes, what do the letters **S** and **X** sent singly, or in combination with another letter respectively signify?

A. **S** that the message is for delivery at the receiving station, **X** that it is to be transmitted. When sent singly they afford in addition to the above, the information that they are private messages.

Q. When using prefixes, what do the letters **B G M** following the letters **S** and **X** respectively signify?

A. **B** designates an **O. H. M. S.** message with priority; **G** one connected with the working of the line, and **M** an ordinary message **O. H. M. S.** Preceded by the letter **S** they signify that the message is for delivery at the receiving station, and preceded by **X** that the message is to be transmitted.

Q. What class of messages are the prefixes **S B** and **S G** confined to respectively?

A. **S B** to messages sent by order of the General or other Officer Commanding or by superior authority, and which are ordered to be sent without delay. **S G** to messages sent by the officer in charge of signalling or his subordinates.

Q. Where are the names of all officers and others entitled to the privilege of sending **S B** messages, usually notified?

A. In Local General Orders.

CODE TIME.

Q. How is the order of transmission of messages of the same class, that is with the same prefix determined?

A. According to the priority of their code time.

Q. Give an example of the use of the code time with regard to the order of despatch of several messages having the same prefix?

A. A central station in connection with several others, on receipt of two or more messages for a given station, bearing the same prefix, despatches them according to the priority of their code time.

Q. What does the code time represent?

A. The hour at which a message is handed in by the sender to a signal station or a military telegraph office, if working in conjunction with the signalling.

Q. When transmitting time by code, what letters denote the twelve hours, the twelve periods of five minutes of which each hour is composed, and the intervening four minutes?

A. The letters **A** to **M** in alphabetical order omitting the letter **J** denote the hours from 1 to 12, they also represent the twelve periods of five minutes; the letters **R S W X** represent the four intervening minutes.

Q. What letters are signalled in conjunction with the code?

A. The letters **A.M.** or **P.M.**

Q. Describe what the letters of the code time indicate when sent singly; in combination of two; and in connection with the intermediate letters **R S W X**; with what letters does the code time in every case conclude?

A. Sent singly they denote hours, in combination of two they represent hours and periods of five minutes; with **R S W X** they represent hours and minutes; in every case concluding with the letters **A.M.** or **P.M.**

Q. How are messages coded if handed in exactly at midnight or noon?

A. **M R A.M.** or **M R P.M.**, as the case may be.

Q. Put into code 6.30 a.m., 3.45 p.m., 4.23 a.m., and twelve midnight.

A. **FFAM, CIPM, DDWAM, MRAM.**

COUNTING OF WORDS AND SIGNS. (*p. 36-7.*)

Q. *In the counting of words and signs how are all initial letters to be charged?*

A. *Separately, as one word each whether a full stop follows them or not,* i.e. "*G.O.C.*" "*A.A.G.*" *must in each case be counted as three words each, and so on.*

Q. *When may these letters and others count as one word?*

A. *If written not in capitals, but in small letters, such a combination as* goc, *or* aag, *would count as one word.*

Q. *When, however, in whatever form the letters are written will they always be charged as one word for each letter?*

A. *When written in the address.*

Q. *If a combination of letters appears to be unintelligible, what steps will then be taken?*

A. *Such a combination will be reckoned at the rate of five letters to a word.*

Q. *How are stops to be counted?*

A. *As one word each, if the sender requires them to be signalled.*

Q. *How are figures to be counted?*

A. *They will be counted at the rate of five figures to a word* i.e. "7," "12" *and* 38563, *would each count as one word.*

Q. *If a number exceeds five figures how will it be counted?*

A. *It will be sent in one group complete, but is counted in the number of words, and charged for, if necessary at the normal rate of five figures to a word.*

Q. *How are numbers written in words invariably to be sent?*

A. *They will invariably be sent in words,* i.e. "*one hundred-and-fifty, and count as four words.*

Q. *What are the rules for signalling, cardinal and ordinal numbers, how are they counted?*

A. *If written in words they must be signalled in words and count as such; if expressed in figures the numeral signs are used; numbers represented by one figure, or a number of digits up to five counting as one word each. A greater number will be charged for at the rate of five figures to a word, but will be sent in one group; ordinal numbers follow the same rule, but an additional word*

is counted in each case for the affixes "st" "rd" "nd" and "th."

Q. In fractions, how should the bar or mark of division between the numerator and denominator, be reckoned?

A. As a figure, thus "$\frac{1}{2}$" is equal to three figures or one word; "$12\frac{3}{4}$" one word; "$109\frac{7}{8}$" two words.

Q. If the affix "ths" be used, how will it be counted?

A. As a word: for example—$94\frac{5}{6}$ths" is equal to two words.

Q. How would a full-stop used in a group of figures be counted?

A. As a figure: thus "12.35" is equal to one word, but if used to separate a group the stop counts as a word: i.e., "2.$\frac{3}{4}$" is equal to three words; "R.30" = three words; "1 . 3rd" = four words.

Q. How do A.M. and P.M. count?

A. When written thus "a.m." "p.m.," they count as one word only; 12.35 p.m., would count as two words.

Q. How are sums of money written in figures to be counted?

A. According to the foregoing rules, one word being added for the symbol "£" when it is used, and one for each of the letters "s" and "d": i.e., "7/6" is to count as one word; "7s. 6d." as four words; "2/7/6" as one word; "£10/19/5" as three words, the oblique stroke counting as a figure.

Q. How will sums expressed partly in figures and partly in words be counted?

A. In the same way as shown in the following examples: "7 pence" must be counted as two words; "10 pounds, 17 shillings" as four words.
But the words "half-penny," "two-pence," "three-pence," &c., when written in full, count each as one word only.

Q. Describe the process of sending figures according to the numerical code.

A. The signaller will first send the special signal **F I** *(to*

be acknowledged by the general answer); when the numbers are finished **F F** *(to be acknowledged by the general answer) to indicate figures finished; all figures will be repeated back by the receiving station, group by group as in cipher, but without the prefix and affix.*

Q. *When sending figures will the signals* **F I** *and* **F F** *be reckoned as forming part of the message, or appear on the message form?*

A. *No.*

STATION CALLS.

Q. How may every station be distinguished, whether a fixed or shifting one; give examples?

A. By a call signal of two letters consisting, in the former case when possible of abbreviations of the names of the places; as **N C** for Newcastle, **P R** for Pretoria. In the latter case the letter **P** followed by a letter of the alphabet, viz. :—**PA, PB, PC,** etc.

Q. Should a field telegraph office and signal station when together use the same call signal?

A. Yes.

SIGNALLING FIGURES & CERTAIN SIGNS. (*p. 38.*)

Q. *How is the oblique stroke as used in the symbol c/o (care of), and used as a division between shillings and pence as 2/6, and as is sometimes the case in fractions to be signalled?*

A. *By the letter "S" repeated three times, thus:*
C ... . O meaning "c/o (care of)
3 ... ... 5 „ "3/5" three shillings and five pence, or a fraction three fifths.

Q. *How is the horizontal bar used in fractions to be signalled?*

A. *By the letter "m" repeated three times, thus:—*
. 3 — — — — — — 5 meaning " $\frac{3}{5}$ *(three fifths).*

Q. *What symbol must precede when figures are sent according to the numeral code, and what follows on completion?*

A. *The special signal* **F I** *to be acknowledged by the General Answer to indicate figures finished.*

Q. *Are the symbols* **F I** *and* **F F** *to be reckoned as forming part of the message?*

A. *No, but will be treated in the same manner as the break signal or* **V E**, *and consequently will not appear in the message form.*

Q. *How are all figures sent according to the numerical code, to be verified?*

A. *They are to be repeated back by the receiving station group by group, in the same way as groups in cipher, but without the prefix and affix* **FI. FF.**

THE MESSAGE.

Q. When signalling in the field with shifting stations what may be omitted in order to reduce the message to its simplest form; will a duplicate in this case be taken?

A. The prefix, code time, office of origin and instructions; no duplicate being taken.

Q. How does a station with letters **P A** call, and conclude its call to a station with letters **P B**; and how does the latter reply to the call and conclusion of the call respectively?

A. **P A** calls **P B, P B, P B**, etc., until **P B** replies with general answer, **P A** concludes his call with **V, P A** signifying "from **P A.**" **P B** replies **P B, G** signifying I am **P B** "go on."

Q. Of what does the preamble of a message consist?

A. The signals, prefix, code time, office of origin, instructions and number of words.

Q. Is there any exception to this rule?

A. When sending messages between the Navy and Army, the signallers of the Navy will not send the number of words, but the Army signallers will invariably adhere to the instructions laid down in the manual.

Naval signallers will note that the figures (always spelt) immediately follow "office of origin" refer to the number of words in the message A. O. $\frac{183}{89}$

Q. When sending a message in its fullest form, enumerate in order, what the sending station signals to the receiving station previous to the text of the message. and after the latter station has sent **G** to it?

A. Prefix, code time, office of origin and instructions, number of words in the whole of message, including address *spelling out the number* (*p.* 39), address of the receiver of the message, and break signal.

Q. When is the name and address of the sender of a message signalled, if they are to be sent, and how are they separated from the other part of the message?

A. After the text of the message, and divided from it by the break signal.

Q. What signal denotes the completion of a message?

A. **V E.**

Q. Immediately a receiving station gets **V E** what is the duty of No. 1, and how does the sending station know that this duty is being carried out?

A. No. 1 counts the number of words in the text of the message to see if they agree with the number sent in the preamble, the station holding up its flag or exposing its light to show that he is doing so.

Q. What do you understand by the expression "Office of origin."

A. The call signal of the station whether telegraph or signal, at which the message is handed in.

Q. Is the address included in the number of words sent in the preamble?

A. Yes.

Q. What would the instructions refer to in the preamble?

A. They would be instructions for the delivery of the message after the wire or station has done its work.

Q. How is each word or group in a message acknowledged by the receiving station?

A. By the general answer.

Q. If the number of words in the text of a message agree with the number sent in the preamble how does the receiving station conclude the correspondence; providing no repetition ?

A. By signalling **R D** to the sending station.

Q. What alternatives may occur previous to a receiving station concluding correspondence with a sending station ?

A. On comparison of the number of words in the text of the message with the number sent in the preamble, it may be found that there are less in the former than in the latter, or *vice versâ ;* or a word or words may require repetition.

Q. If a receiving station finds on comparison that it has a less number of words in the text than were sent in the preamble of the message, what course does it and the sending station pursue ?

A. It signals to the sending station the number of words it has in the text followed by the letter **W,** the sending station then signals the first letter of each word which is answered as usual by the receiving station until the error is discovered when the latter station sends "**G,**" which signifies "spell out that word." When the missing word or words have been signalled the receiving station concludes the correspondence with **R D.**

Q. Should a sending station signal in the preamble to a receiving station an incorrect number of words, on the latter station sending back the correct number of which it has in the text, how does the sending station acknowledge its error ?

A. By repeating back the correct number followed by the letters "**R T.**"

Q. If a receiving station requires a word repeated, how does it ask for it ?

A. By sending **W A,** or "words after," followed by the word or words preceding the doubtful word.

Q. What signal is implied when sending the letters **W A** to ask for repetitions?

A. The repeat signal.

Q. What three kinds of repetition might a receiving station require and how would it ask for them?

A. Should it require a word only it would send **W A** followed by the word, or if necessary words preceding the doubtful one; if the remainder of the message is wanted, it would send the repeat signal followed by **A A** or "all after" followed by the word or if necessary words preceding the remainder of the message required, or should it require the whole message, the repeat signal followed by **A L L**,

Q. When a station has got all the repetitions it requires, what acknowledgment does it send?

A. **R D** which concludes the correspondence.

Q. What count as one word each in the text of a message?

A. Each group, a.m and p.m. and initial letters whether divided by a full stop or not, if written in capital letters.

Q. In reckoning the number of words in a message is **V E**, *F I*, *F F*, the break signal, the cipher sign, and the signals indicating that figures are intended, and their completion, counted.

A. No, *they should not appear in the form at all (p* 41*).*

Q. How are figures and hours (if spelled and not expressed in numerals), signalled; are commas sent?

A. As words in full; commas are never signalled.

Q How are figures and hours expressed when not spelled?

A. By the numeral signs and code.

Q. How is 12.45 a.m. sent in the text of a message, and how many words is it reckoned?

A. **M I A M** and counts as two words.

Q. How is every word or figure of a message to be transmitted?

A. Exactly as written by the sender without abbreviation or addition.

Q. Does the rule that every word or figure of a message is to be transmitted exactly as written by the sender, apply to press or news messages ?

A. No.

Q. When messages cannot be forwarded on the same day what words should be sent after the code time ?

A. " Last night," " yesterday morning." etc.

MESSAGE FORMS.

Q. Is the new message form (Army Book 119 A) entirely identical with that used in the field telegragh at transmitting stations ?

A. Yes ; with the exception that it is printed on grey paper whereas the telegraph form is on yellow.

Q. May the form of message written on grey paper be used for the original message sent, *i.e.*, written by the *addressor* (*p.* 41) ; when is it always used ?

A. It can be used for the original message written by the sender and it is always used at transmitting and receiving stations.

Q. Enumerate the forms, etc., on which an original message may be written.

A. The form printed on grey paper, the sending telegraph form (white paper), or on a plain slip of paper.

Q. Directly a written message is received at a sending station, what particulars will be entered on it and by whom ?

A. The prefix, code time, office of origin and instruction if any, number of words in the message (including the names and addresses of the sender and addressee), the station call of the station, and the date entered on the message by No. 1 of the party, or by the non-commissioned officer or man specially detailed should there be one available.

Q. When a message is received at a sending station written on a plain piece of paper, how and where will the preamble be entered ?

A. Above the message, thus :—

Prefix, Code time, *Office of Origin* (*p.* 42), No. of words, Station and Date.

Q. When, and with what object may the duty of filling in the preamble of messages be performed with advantage by a Non-Commissioned Officer or soldier specially detailed ?

A. At very important stations where additional men are available, in order that the working of the signal party may not be interrupted.

Q. If no non-commissioned officer or extra hand is available what are the duties of No. 1 besides filling in the particulars of a message ?

A. He keeps all messages awaiting their turn to be forwarded, arranging them according to their prefixes and code times; as each message is forwarded he notes thereon the time at which its despatch was concluded, and the name of the signaller who sent it; he then guards the message on a file.

Q. Does the preamble of a message concern the originator of it or the addressee ?

A. No ; it is for the information of the signaller alone.

Q. What information does the **X** in the prefix of a message give to a station ?

A. That the message must be forwarded.

Q. How does a station at once know that the carbon paper is to be used, *i.e.*, that a duplicate copy is required ?

A. By the presence of an **S** in the prefix of a message.

Q. Will it be necessary to use the carbon paper for any message with an **X** in the prefix ?

A. No, as an **X** message is one that has to be transmitted, one copy only is required.

Q. What does No. 1 of the party enter in the spaces allotted to them as an **X** message comes in at a transmitting station ?

A. He fills in the preamble and places in the space at the right hand top corner of the form, the "Call signal of his own station and the date."

Q. What does No. 1 of the party at a transmitting station do, when the whole of an **X** message has been received there?

A. He enters in the space marked "Received," the time, the call signal of the station from which he received the message, and the name of the signaller who read it, he then hands the message to No. 1 of the other party in communication with the station to which it has next to be transmitted.

Q. At the transmitting stations composed of two complete parties, what particulars does No. 1 of the second party enter on the message after it has been forwarded?

A. He enters in the space headed "Sent," the time of despatch from his station, the call signal of the station to which it has been sent, and the name of the sender.

Q. How may a considerable discrepency between the times of receipt and transmission of a message be accounted for on the message form?

A. By a note made thereon of the cause of the delay such as;—"line occupied till ——," "hazy till ——," "rain in middle of message," &c.

Q. Where is the message continued if it exceeds the number of words for which space is provided on the form.

A. On a second or subsequent sheets.

Q. When a party at a transmitting station receives an **X B** message for transmission, that they know will reach its final destination at the next station, how will they transmit it?

A. As an **S B** message.

Q. How are messages and figures to be written?

A. Very clearly.

Q. What details in a message should be written in Roman capitals?

A. Important words, proper names, code words, and cipher letter groups.

Q. By whom are all messages to be signed?

A. The "addressor" *i.e.*, originator, or other person duly authorized to send messages in his name.

Q. What is the object of the signature in the space *(3)* of the form; is it signalled with the message? *(p. 43.)*

A. It is necessary for identification of the sender and to support the authenticity of message; it is not signalled.

Q. Give the rules for franking messages.

A. In franking messages it must be clearly stated on what service they are sent and to what account they are to be charged. Franking signatures should be written within the space *(1)* *(p. 43.)*

Q. How are messages that are not franked, paid for?

A. By cash or warrants.

Q. What care should be taken as regards the length of addresses?

A. That they are curtailed as much as possible.

Q. Why need not the "station from" be written after the "name from" in a message?

A. Because the office of origin which is the "station from" is signalled in the preamble and addressee's copy.

Q. What address is as a rule sufficient for any government message?

A. A surname and place "to" and a surname "from."

Q. Who is the "Addressee"?

A. The person to whom the message is directed.

Q. What code is used when practicable, in long messages, and especially in cable messages?

A. The authorized government code.

Q. When are the authorized abbreviated addresses employed, if duly registered?

A. When surnames cannot be used in addresses.

Q. To what degree, and when are the instructions on the back of the message forms to be observed by signallers?

A. As far as possible, when working with the telegraph.

Q. When are the instructions in compressed type on the face of the forms used?

A. With the telegraph in the field, they are not generally applicable to signallers.

Q. When a signal party at a receiving station gets a message with the letter **S** in the prefix, what does No. 1 do, and with what object?

A. He inserts the carbon paper between two leaves of the book and takes the message in duplicate, in order to have one copy as a station record and another to forward to the addressee.

Q. Is it ever desirable for the information of the receiver of the message, to translate the code time into ordinary figures, or the call signal of the office of origin, into its full name, if so, by whose direction should it be done?

A. Yes, the occasion being determined by the officer in charge of the signalling operations.

Q. What space only in the preamble is it necessary to fill in when signalling in a field with shifting stations?

A. The space marked "Words."

VI.—WORKING OF SIGNAL STATIONS IN THE FIELD.

DUTIES OF INDIVIDUAL SIGNALLERS.

Q. How many descriptions of signal stations are there, and what are they called?

A. Two, *i.e.*, "terminal" and "transmitting."

Q. How many men is a terminal station to consist of; and by what number can it be worked?

A. When practicable by three men, but under urgent circumstances, or without telescopes, two.

Q. What is the chief disadvantage of a signal party working under strength?

A. Considerable delay is caused in the transmission of messages.

Q. What does a signal party consist of?

A. Three men with full equipment for sending and receiving messages.

Q. What is a transmitting station composed of?

A. Two complete signal parties.

Q. How many men can perform the work of transmitting a message directly through a station, with, and without telescopes?

A. When using telescopes five, or even four men, otherwise three.

Q. When does a transmitting station virtually resolve itself into two terminal stations?

A. When it is composed of its normal number, *i.e.*, two complete signal parties, and messages have to be taken from both directions at once.

Q. Are the reliefs included in the numbers three and six of which a terminal and transmitting station respectively consist of?

A. No.

Q. Describe as briefly as possible what are the duties of the men and with what they are respectively provided at a terminal receiving station of the normal number.

A. No. 1 (message book and pencil) calls out words or groups to No. 3.

No. 2. (telescope) reads answers, and calls out "answered to No. 1."

No. 3 (flag, lamp or heliograph,) sends on.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided at a terminal sending station consisting of two, a telescope being used.

A. No. 1 (message book, pencil and telescope) calls out words or groups to No. 2, and reads answers.

No. 2 (flag, lamp or heliograph) sends on.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided at a terminal receiving station of normal number.

A. No. 1 (message book and pencil) writes down each letter as called out by No. 2.

No. 2 (telescope) reads and calls out "answer" to No. 3.

No. 3 (lamp, flag or heliograph) answers.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided at a terminal receiving station consisting of two, a telescope being used.

A. No. 1 (message book, pencil and flag, lamp or heliograph) writes down each letter as called out by No. 2, and answers.

No. 2 (telescope) reads, and calls out "answer" to No. 1.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided, at a terminal sending station consisting of two without telescopes.

A. No. 1 (message book and pencil) calls out words or groups to No. 2 to send on and reads answer.

No. 2 (flag, lamp or heliograph) sends on.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided, at a terminal receiving station consisting of two without telescopes.

A. No. 1 (message book and pencil) writes down each letter as called out by No. 2.

No. 2 (flag, lamp or heliograph) reads and calls out each letter to No. 1, and answers.

Q. When the normal number of men are available for a transmitting station, how are they arranged and in what way are the messages transmitted ?

A. They are divided into two separate parties of three men each and work as two terminal stations; the Nos. 1 of each party exchange messages for transmission as soon as received.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided, at a transmitting station consisting of five with telescopes.

A. No. 1 (message book and pencil) writes down each letter as called out by No. 2. Calls out words or groups to No. 5 to send on.

No. 2 (telescope) reads, calls out each letter to No. 1 and "answer" to No. 3.

No. 3 (flag, lamp, or heliograph) answers.

No. 4 (telescope) reads answers and calls out "answered" to No. 1.

No. 5 (flag, lamp, or heliograph) sends on.

Q. Describe as briefly as possible the duties of the men and with what they are respectively provided at a transmitting station consisting of four. with telescopes.

A. No. 1 (telescope, message book and pencil) writes down each letter as called out by No. 2, reads answers and calls out words or groups to No. 4 to send on.

No. 2 (telescope) reads, calls out each letter to No. 1 and "answer" to No. 3.

No. 3 (flag lamp or heliograph) answers.

No. 4 (flag, lamp, or heliograph) sends on.

Q. Describe as briefly as possible the duties of the men

and with what they are respectively provided, at a transmitting station consisting of three, without telescopes.

A. No. 1 (message book and pencil) writes down each letter as called out by No. 2, and calls out words or groups to No. 3.

No. 2 (flag, lamp, or heliograph) reads, calls out each letter to No. 1 and answers.

No. 3 (flag, lamp or heliograph) sends on words or groups as called out by No. 1, reads answers and calls out "answered" to No. 1.

Q. When a transmitting station is not in the same straight line with the two adjoining it, how is the arrangement of the men to be modified to fufil the conditions essential to success?

A. The men who have to speak to each other are to be as close as possible, and the flags as wide apart as can be arranged, without crossing one another, or interfering with the telescopes.

RULES TO BE OBSERVED BY SIGNAL PARTIES.

Q. What rules as regards detail is it absolutely necessary for every signal party to observe to ensure success?

A. That the strictest attention be paid to each case however trifling it may appear in itself.

Q. What responsibility rests on the senior officer or non-commissioned officer as regards the protection of his signal party from interruption, and securing the best results from their work?

A. To see that no single point necessary to the attainment of success is disregarded, that no unauthorized persons loiter about the vicinity of his station, nor within hearing of the reading of a message, and that no person interferes with or disturbs the duties of his party.

Q. Towards which direction should a signal party keep a good look out?

A. From that quarter from which it is likely that signals may be received.

Q. What talking only is permissible at a signal station when actual work is going on?

A. The calling out of letters and the giving of necessary orders.

Q. To what is each man of a signal party absolutely to confine his attention?

A. His own work.

Q. On the first call of the look out man of a signal party what must every man be ready to do?

A. Take his proper place.

Q. If a signal party consist of three men, are the duties of No. 1 necessarily performed by the non-commissioned officer or signaller in charge of the party?

A. No, every man should take his turn at the duties of the three numbers alternately.

Q. How are the duties of a signal station allotted to the individual men of a signal party in the field?

A. Each particular duty is to be allotted to the man most adapted to it.

Q. Enumerate the responsibilities and duties of No. 1 of a sending station of three men.

A. He has charge of the message book, pencil and message forms handed in to the station, he is responsible that the regulations with regard to the completion of the message forms are strictly adhered to, he reads the message word by word to No. 3, giving each word the moment No. 2 has called "answered."

Q. Describe carefully the duties of No. 2 of a sending station of three men.

A. He should keep his eye constantly on the distant station and give the word "answered" to No. 1 the moment he sees the signal from that station. When reading by telescope he should keep his eye constantly at that instrument.

Q. Describe carefully the duties of No. 3 of a sending station of three men, and what is he to bear in mind with regard to the rate at which he signals?

A. He should pay attention to his flag, lamp, or heliograph, as the case may be, and abstain from looking at the distant station, remembering that if he gives his signals distinctly and in regular time he cannot make them easier to read by sending them slowly.

Q. What interval is allowed before repeating a word or group, in order to give the receiving station an opportunity of answering?

A. About the time taken to send the letter **M** or two dashes.

Q. In practice, if a word can be read, is it generally answered before the interval of two dashes can elapse?

A. Yes.

Q. How should No. 1 of a receiving station of three men write down a message?

A. In a clear running hand, letter by letter, and not in block characters.

Q. If the letters No. 1 takes down do not form an intelligible word what course should or will he pursue?

A. Direct No. 2 to take the word again.

Q. On the completion of a message what should No. 1 of a receiving station of three men lose no time in doing, and how should he be able to order the acknowledgment of the message, if correct, the instant **V E** has been received?

A. In asking for a repetition of doubtful words, and by counting the number of words in the message as he takes them down he will know on its completion if it agrees with the number in the preamble.

Q. Is No. 1 of a receiving station of three men, while taking down a message to make any remarks as to the meaning of the words, or is he to guess at the meaning of unintelligible ones?

A. No, he is to be especially cautious not to do so.

Q. Describe carefully the duties of No. 2 of a receiving station of three men.

A. He should keep his eye constantly on the distant station, call out each letter as he reads it if he is sure of it; never repeat any letter or letters, and at the end of each word or group call "answer" to No. 3.

Q. When does No. 3 of a receiving station "answer" and not answer even though he has been told to do so?

A. He answers when he gets the word to do so from No. 2 of the party unless he hears No. 1 say "Take it again."

Q. Describe the several operations of signalling between which men must be careful that they lose no time?

A. *a.* Between hearing the word to be sent and beginning to send it.

b. Between seeing the answer given and calling out "answered."

c. Between hearing the "answered" given and giving the next word to be sent on.

d. Between receiving the last letter of a word and calling out "answer."

e. Between hearing the word "answer" and giving it.

Q. During the operation of signalling what should each man be ever ready to do?

A. To begin the duty which next devolves on him at the moment he hears the call to do so.

Q. How is a message sent on the heliograph *or lamp* from a sending station with sun *or light*, to a receiving station without it? (*p.* 58).

A. The sender gives the "signallers indicator" followed by **K K, K K,** and proceeds with the message *sending* (*p.* 58) every word twice.

Q. What is an **A A** message, how, by whom, and for what purpose is it sent?

A. An **A A** message is sent by one signal party to another,

on matters connected with their work, it need not be recorded, and requires neither the name or address of sender or receiver, the letters **A A** precede and conclude the message, which is abbreviated according to the table in the Manual and sent as a different group, or may be a short message for which no abbreviation has been designed.

Q. What is an **S G** message, how, by whom, and for what purpose is it sent?

A. An **S G** message is one connected with the working of the line. it should be sent in the same manner as a service message, a record being kept of it; as a rule it is employed by an officer of the signalling staff, but can be used by signallers in charge of a station to make inquiries about messages that have been sent over the line.

Q. When referring to a previous message how is it described; when is the date also necessary for its identification? give an example of the latter case.

A. By its code time and name of the sender, the date is necessary when it was sent on a previous day thus "**B K** Smith fifteenth" would signify that the message was handed in by Smith at 2. 50 on the fifteenth of the month.

Q. When is it not necessary to continually repeat an address? give an example.

A. When a succession of messages are exchanged between two officers, provided it has been so prearranged and is understood by all concerned; an example would be the officer in command of an outpost and his commanding officer.

Q. What annuls the value of speed in signalling?

A. Error in sending or reading.

Q. What qualities are of vital importance in conducting signalling, and what is often the result of a little hurry?

A. Patience and deliberation, hurry in sending or receiving a message often causes long delays.

Q What must be first secured before rapidity is attempted?

A. Absolute certainty in reading and sending?

Q. Are signallers to hesitate to ask for repetitions?

A. No, nothing must be taken for granted, repetitions of words or sentences about which there is any doubt should be asked for in the prescribed manner.

Q. What kind of messages only is a non-commissioned officer in charge of a station to receive, and if the sender hands in the message himself what suggestions may the non-commissioned officer offer, and with what object?

A. Only messages written and signed; he will make any suggestions to him concerning the wording of the text, etc., with a view to rendering the message more adapted for transmission.

Q. Is a non-commissioned officer in charge of a station ever to take the responsibility upon himself of making any alteration whatever in a message?

A. No.

Q. Are men allowed to spread or make any use of intelligence they may receive in their capacity of signallers?

A. No, they are always to bear in mind the confidential nature of their work, and must be most cautious never to disclose even the sense of the messages, which have passed through their stations.

SELECTION OF POSITIONS FOR SIGNAL STATIONS, BACKGROUNDS, ETC.

Q. On what besides the skill of the signallers, does the speed and certainty with which information is conveyed in a great measure depend?

A. On the selection of signal stations.

Q. Why is it best, while having a due regard to the general operations of the army, and the safety of signal parties, to select the highest points for heliograph stations?

A. Because the distance at which the heliograph can be read, as long as the atmosphere is clear is practically unlimited.

Q. Why is it more difficult to select a position for a flag station than one for a heliograph?

A. Owing to the limited range at which the flag is seen.

Q. Mention in their order of importance, the things that are to be kept in mind when selecting a position for a station, especially one for the flag?

A. A clear view of a station already established, with which it is intended to communicate; a good view of other points which may be advantageously occupied as signal stations; and if possible concealment from the enemy.

Q. How may the greatest distinctness be given to signals by day and night, putting the manipulation of the different means of signalling out of the question?

A. By day: by providing the greatest contrast obtainable between the object displayed and the background on which it is projected; by night: (remembering that the light of the lamp is a very small object) by clearing its range of branches, brushwood, &c., in the direction of the station addressed.

Q. How does the atmosphere surrounding hills or eminences, raised considerably above the plain, frequently effect signalling after sunset, and how may this be avoided?

A. By becoming more or less misty signalling on such heights is rendered difficult, but by moving the station lower down it may be often carried on with facility.

Q. Define the meaning of the word "background" as used in signalling.

A. That exact spot upon which signals, sent by any method, appear projected to a signaller at another station.

Q. How is the colour of a background ascertained?

A. By two men taking a rod or flag pole, each holding it in his right hand and looking along it, one directing

it towards the station, and the other observing the background marked by it.

Q. Why are the lightest and darkest backgrounds the most easy to read signals upon when working with the flag?

A. Because by using a dark or light flag the greatest contrasts can be got from them.

Q. Give examples of light, dark, and intermediate backgrounds; under what conditions do they respectively appear lighter or darker?

A. Sky is the lightest background, then water and distant land; green or stubble fields are intermediate backgrounds; bare earth, rocks and trees are the darkest; the nearer an object is to a light or dark background the lighter or darker the background appears?

Q. How does the position of the sun affect backgrounds?

A. All backgrounds become lighter when the sun is opposite them, darker when it is behind them.

Q. What exceptions are there to the rule that backgrounds become lighter or darker as the position of the sun is opposite or behind them?

A. Light mists which rise from valleys towards evening, or the smoke of habitations, both of which form a lighter background than the surrounding country, whatever may be the position of the sun.

Q. State the most favourable condition for flag signalling?

A. A clear atmosphere and a clouded sun.

ESTABLISHING THE STATION.

Q. What place does the officer or non-commissioned officer of a signal party first determine, on its arrival at a position selected for a station, and how is he assisted in his choice?

A. The *spot from which to signal* (*p.* 62), aided by signals from the distant station.

Q. Why is it important when establishing a station, first to post the *sender* (*p.* 62) in the most favourable position?

A. So that it may not be necessary to move him subsequently, should a change in the weather alter the background, and thus throw out the whole party.

Q. *Should it be necessary to construct a fireplace what precautions should be observed in connection therewith?*

A. *It should be so situated that its smoke does not cross the line of communication* (*p.* 62).

Q. When establishing a station, and after the position of the *sender* (*p.* 62) has been determined, what should next be put into position and in what manner?

A. The telescope, arranged in such a manner that the reader lying comfortably behind it can give his undivided attention to each letter he sees.

Q. When establishing a station, what considerations determine the positions of No. 1, and why should he sit or lie down?

A. He takes his place where he can best hear the letters called out, and be heard by the man who takes the words from him to send on; he sits or lies down in order to be able to write conveniently.

Q. What does the operation of receiving or sending a message, simple though it be, require; and how may delay affect a party employed on it?

A. A message having once begun, the strain on each man is considerable, and any delay interrupts the concentrated attention of the whole party, which it is not easy to restore, consequently a maximum amount of attention is required from every man engaged therein.

TACTICAL APPLICATION OF SIGNALLING.

Q. What knowledge is essential to all who make use of signalling or are engaged in it?

A. A just appreciation of what can, and what cannot be done by it.

Q. Of what is a signal officer on first taking the field to assure himself?

A. That his men are up to their work and properly equipped.

Q. How does a signal officer in the field organize his men with respect to their individual duties?

A. So that each man has that work assigned to him for which he is best fitted.

Q. What is meant by the degree of efficiency of a signal party?

A. That degree of aptitude which it possesses for the carrying out of instructions.

Q. As soon as a signal officer in the field has learnt the degree of efficiency of his signal parties and completed the organization of his stations along his line of communications, to what should he next turn his attention?

A. Acquiring a knowledge of the country in which he has to use them, neglecting when so doing, no means of studying the ground not only to his front but in every direction where it may be necessary on some future occasion to form stations.

Q. With what should the arrangements of an officer in the field regarding the rate of signalling of his parties, etc., accord, and what should be taken into consideration in connection therewith?

A. The efficiency of his men and not what he considers signallers generally ought to be capable of doing. The failure of one man may cause the entire destruction of his plans, seeing that he cannot expect from a signaller, knowledge which it requires weeks of practice for an indifferent one to acquire.

Q. Why are signal stations which forward and receive messages to be as near as possible to the source and receiver of information?

A. In order that the time lost in conveying the messages to the sending station, and delivering them to the

addressee from the receiving one, will not neutralise the time gained in sending them by signal.

Q. When a signal and telegraph stations are working together how should they if possible be placed?

A. In juxtaposition one to another.

Q. Is it as a rule easier for the position of the telegraph station to conform to that of the signallers?

A. Yes.

Q. How is an officer in the field to issue instructions to his signal parties, and how should he make sure of their being carried out?

A. Not only in writing but also so worded as to prevent misunderstanding; insuring their preformance by the utmost personal supervision.

Q. Who in the field should be placed in charge of a signal party when the position is an insolated one?

A. A non-commissioned officer of superior intelligence.

Q. Who in a field should take charge of a station, of unusual importance, or one forming the junction of two or more separate lines of communication?

A. An officer.

Q. Which is the surest way in the field of taking up a line of communication by signal stations?

A. By working from a point already occupied to the next within sight of it, and so on to another, and thus prolonging an existing line.

Q. How does the length of time a signal station remains fixed, effect its value as a means of communication?

A. The longer it is in position the more advantages it offers to the employment of signalling.

Q. On what does the utility of signallers in war, both as regards speed and accuracy, in a great measure depend?

A. The skill with which the parties are placed in the first instance, and if compelled to move, the intelligence with which they select new positions.

Q. What information should a signalling party prior to shifting its position give to its corresponding party?

A. It should signify its intention of moving, and the direction which it proposes to take, *quoting the "compass direction"* (*p. 64.*)

Q. State why signallers are more advantageously employed on the defence than in the attack?

A. On the defence there are more opportunities for selecting stations for them, whilst at the same time letting each party know what is required of them. In the attack being ever on the move they are apt to lose sight of one another and thus if the distances be great, or the lines of communication in any way interrupted, are likely for a time to become useless.

Q. When should a **K K**, **K K**, message be acknowledged by the receiving station?

A. As soon as possible.

Q. Why in a sunny country, where the heliograph is in constant use, is the disadvantage of not having pre-arranged a station, less felt?

A. Because the flash of light from the instrument is generally sufficient to call the attention of a signal party on the look out.

Q. What should signallers be thoroughly trained in besides the use of their signalling instruments and with what object?

A. The compass and the reading of maps, to assist them in recognizing their positions and taking up fresh ones as occasion may rise?

Q. When in the field is there no absolute certainty that communication by signal will be maintained?

A. When the signal stations have not been thrown out on a carefully pre-arranged plan.

Q. What is essentially necessary to be borne in mind to make signallers with shifting stations effectual in the field?

A. That a good look out is invariably maintained.

Q. Give an example how a station is arranged for signallers by an officer, in prospectu, as well as in the first instance?

A. When a look out party placed in a certain position to give information concerning the enemy, is instructed as to the positions it is to take up in the event of its having to advance or retire.

Q. Is the fact of the fortune of war sometimes upsetting pre-arranged plans any reason for not making them?

A. No, every contingency likely to occur should as far as possible be thought out before-hand.

Q. Give an example to illustrate why signal stations should be posted as near as possible to the ordinary lines of communication, *i.e.*, roads and paths.

A. An orderly sent with a message to a signal station which lies on his way on finding that communication is interrupted can continue his course and carry the message to its destination, or to the next station without loss of time.

Q. What do cavalry advancing to make a reconnaissance, or to cover the march of a column, avoid by the employment of signalling?

A. The fatigue to men and horses which, if it were not for the signalling, would be incumbent on them in conveying information to the rear.

Q. On a forward movement of cavalry where are the mounted signallers to be, and what is the usual way of establishing stations with them?

A. They march with the advance guard. Before starting, a position is chosen from the signal station that is nearest the direction of the march (say from $1\frac{1}{2}$ to $3\frac{1}{2}$ miles distant), when this position is reached or covered by the cavalry, it will be occupied by a mounted signal party who will communicate with the station in the rear, and choose the position for the next advance station, which will in its turn be occupied as soon as it is protected by cavalry.

Q. As cavalry push forward, by whom should the mounted

signallers occupying the stations in rear be relieved, and for what purpose?

A. By dismounted signallers, in order that the mounted men may be utilized in front?

Q. Why is a signal officer, with one or two orderlies, invariably to accompany the officer in command of the cavalry, or whoever may be responsible for the collecting and testing of information received from the scouts?

A. To note the position of each signal station as it is posted, so that the nearest point from which information can be sent back may be always known.

Q. What limits the number of lines of signal stations that are taken up during the advance of an army corps?

A. The extent of front occupied by the columns together with the nature of the country.

Q. When can lateral communications between columns on the march be reckoned on?

A. Only in a open country.

Q. Why is a signal station not to expose itself in front until the next station in advance is taken up?

A. On account of the advantage of concealment from the enemy.

Q. Should a signal station ever be taken up in advance of an advance guard, or at the halt, in front of a line of picquets?

A. Not as a general rule.

Q. Where, and in what way, during duty of reconnaissance or observation may a single flag-man be often of use?

A. As far forward as the line of vedettes, at an important post of observation or "detached post" where the vedette is doubled, a signaller may be stationed specially told off, who will send back to the nearest station or picket continuously the observation of the vedette.

Q. Why should not signallers at advanced positions send back the results of the observations made by look-

out men without the knowledge of the officer responsible for collecting and weighing all information obtained?

A. Owing to the danger of transmitting to a distance, the crude observations of a vedette it is at all times considered advisable that such messages should be confined to a statement of well attested facts, especially as a message received through a signal station cannot readily be questioned, but must be taken and acted upon as it stands.

Q. To what are messages affording information in the field to be confined?

A. The carefully formed conclusion of a responsible officer of experience.

Q. What written order should officers in charge of signallers in the field obtain from the general or officer commanding to protect them from interruption in their signalling duties, and to whom should they furnish copies?

A. An order duplicated to all non-commissioned officers in charge of stations that unauthorized persons, whether officers or men, are not allowed to loiter near their signal stations.

Q. What is one officer at least of each General's staff to be made acquainted with, regarding the means of communication by signal?

A. The position and working hours of all signal stations, so that he may know when the means of communication are open, and to what extent.

Q. To whom do the details contained in the preamble of a message, (prefix, code, office of origin, service, instructions, number of words) afford information. Do they concern the originator or addressee?

A. The signallers only, and do not concern either the originator or addressee of the message.

Q. If a message is doubted, or there appear substantial reasons for complaint concerning its transmission,

to whom and how may application be made, and what steps should then be taken?

A. Complaint should be made in writing to the officer in charge of signallers, who, having made the necessary enquiries, reports accordingly.

Q. Should any complaint in writing concerning the transmission of a message be retained, if so, by whom?

A. Yes, by the officer in charge of signallers.

VIII.—MISCELLANEOUS SUBJECTS.

INSTRUCTIONS FOR THE USE OF CIPHER.

Q. Why is a cipher in an enemy's country, as well as under other circumstances, of great importance; whether the means of its transmission be by hand, visual signal, or electric telegraph?

A. Because though perfectly intelligible to the persons it is intended for, it is not so to those into whose hand it improperly falls.

Q. Why does the assertion, that an absolutely secret cipher has not yet been devised (if time and labour can be given to its discovery) not prevent its employment in the field?

A. Because, to anyone not possessing the key of a cipher message, the time that must elapse before discovering its purport will in nearly every case render the information stale and valueless.

Q. How is the most efficient cipher for messages made?

A. By means of a cryptograph which is either a cipher wheel or tablet.

CIPHER WHEEL.

Q. Describe the cipher wheel.

A. It consists of an outer circle with the letters of the

alphabet round it, and an inner one with the same in reversed order, the disc upon which the latter is inscribed is pivoted at its centre, having an arm attached, fixed arbitrarily at any letter.

Q. How is the disc of the cipher wheel turned ?

A. By working the mill head.

Q How many rows does the cipher tablet consist of and what do they contain ?

A. Three, the first, the key table, consists of a single alphabet arranged in order in the centre ; the second row has a travelling plate with stud and index to regulate the plate, from which the true letters of the message are read ; the third row consists of two alphabets in reversed order from which the cipher letters are taken.

Q. Can the second and third rows of the cipher tablet be arranged arbitrarily ?

A. Yes.

Q. Is it necessary for the sender and receiver of a cipher message to work with identically the same instrument ?

A. Yes.

Q. When using the cipher wheel and tablet for transmitting from where are the letters of the keyword and true message taken respectively ?

A. In the cipher wheel both the letters of the key word and true message are found on the outer ring : in the tablet the letters of the former are taken from the first row, whilst those of the latter are taken from the second.

Q. Where are the letters of a cipher message read on the cipher wheel and tablet respectively ?

A. When using the cipher wheel, on the inner ring with the tablet in the third row.

Q. To communicate by cipher, what is necessary in addition to a cryptograph ?

A. For the corresponding parties to arrange a mutual key word (or words).

Q. When using the wheel how are the words of the true message and key word written down when it is required to turn a message into cipher?

A. The letters of a true message are written with a space between each, and under them the letters of the key word, repeated as often as required.

Q. Describe the process of converting a message into cipher with the wheel, after the key word has been written under the true message.

A. Set cipher wheel arm at first letter of key word, and take out at once for whole message cipher letters on inner ring corresponding to true letters on outer ring, which appear above the first letter of the key word, wherever it occurs. Write these down, then move the cipher wheel arm to next letter of key word and proceed as before.

Q. When is the process of converting a message into cipher with the wheel completed?

A. When the key word has been passed through by the arm of the cipher wheel.

Q. How is a message converted into cipher, using the tablet?

A. Write the key word under the true message, place index on slider opposite first letter of key word on the first row, take out for the whole message the cipher letters from the third row corresponding to the true letters on the second row, which appear above the first letter of the key word wherever it occurs, write these down in their places; then move the index on slider to next letter of key word and proceed as before.

Q. How is a cipher message deciphered with the wheel?

A. Write down cipher letters with key word underneath them, repeat as required; turn the arm to first letter of key word on outer ring, read off all cipher letters on inner ring, and write down their corresponding letters on outer ring, consecutively under-

neath the first key letter, proceed thus till the letters of the key word are finished.

Q. How is a cipher message deciphered with the tablet?

A. Write down the cipher message with key word under it, set index of slider to first key letter on first row; read off cipher letters from third row, and corresponding letters of true message from the slider, and write them down as when using the wheel.

Q. How is a message for transmission in cipher to be broken up?

A. The portion for transmission, into groups of *five* (*p.* 73.) letters.

Q. How is the cipher sign and groups of *five* (*p.* 73.) letters between it acknowledged respectively?

A. The cipher sign by the "general answer"; the *cipher* (*p.* 73.) groups by being repeated back to the sending station.

Q. When working in cipher if a group is sent back incorrectly from the receiving station what steps does the sending station take?

A. It sends the "erasure," which is answered by the "erasure," and then repeats the group, and if correctly replied to by the receiving station, proceeds with the next group.

Q. When working in cipher why is the man reading the repetitions from the receiving station not to know the group that has been sent?

A. As an additional precaution; if the man reading knew the letters that were sent, should they be repeated by the receiving station incorrectly, he would be apt to read them as he knew them sent in the first instance, *i.e.*, rightly.

Q. *When only a portion of a message is in cipher what precaution should be observed?*

A. *That the* **C C** *should precede and follow each portion of cipher* (*p.* 73.)

Q. What simple plan will answer all outpost purposes in sending cipher messages?

A. Divide a square into 25 spaces, and number them consecutively from 1 to 12, this will leave the centre square unnumbered, then commence to number the remainder (leaving the centre square unnumbered) from 12 to 1, so that the corner square on the right hand of the bottom line is No. 1.

This method of numbering them, and the keyword is all that one has to remember, so that when a message in cipher is received one has only to draw roughly a square and number the divisions as stated.

The key word can be changed daily, or whenever it is considered necessary; it should be a word of at least six or seven letters and must not have any letter repeated in it.

The letters composing it are accordingly spelled along the spaces from left to right beginning at the left-hand top corner. The succeeding spaces are filled with letters thus:—the space following that on which is written the last letter of the key is marked with the letter **A**; *or if that letter is contained in the key word, then the letter nearest it in the alphabet in order of sequence which may not be in the key word, and so on through all the spaces.*

Q. How should the cipher (whether letters or figures) be written?

A. In groups of five letters or figures so that whilst avoiding giving any clue to the length of the words used, the accidental omission of letters or figures may more easily be detected.

This is especially necessary when the messages are transmitted by signal or electric telegraph.

Q. How is a cipher message compiled by this simple method?

A. For every required letter of the alphabet having formed it in the diagram, see the number of its space and

substitute for it in the message the letter in the space having the corresponding number.

Q. *The centre square having no number, under what circumstance is the letter therein contained used?*

A. *If necessary to use the letter the true letter itself is used.*

Q. *How is a message deciphered with this form of cipher?*

A. *The process of deciphering is merely a reverse of the process of ciphering* (*p. 73—76*).

RETURNS.

RATES OF WORKING AND TEST MESSAGES.

Q. What is a monthly practice return, how is it prepared and what does it show?

A. A return (B. 226) in duplicate, one copy being retained by the regiment, the other forwarded through the general to the quarter-master-general quarterly. It contains a column for the name of every signaller in the regiment by rank in the following order, *viz*:— trained signallers, supernumeraries, and men under instruction, with the results of the monthly test of the former. There is a column for every day of the month in which is entered the description of the practice on the day it is performed; there is a column for remarks, and instructions for the completion of the return, together with places for the signature of the commanding officer and regimental instructor.

Q. How are brigade and regimental practices shown in the monthly practice return, also practice by night and class under instruction?

A. The letters B and R inserted in the columns on the days they are performed show brigade and regimental work respectively, with the letter N beneath them if night practice takes place; a class under instruction

is shown by an I for every day of practice till completion.

Q. Where in the monthly practice return are the names of all officers and men, who become non-effective during the quarter inserted, and what particulars should accompany these entries?

A. Below the list of men under instruction ; with the date and cause of their becoming non-effective.

Q. By whom is the monthly practice return signed?

A. By the commanding officer and regimental instructor.

Q. By whom and when are the entries of practice made in the monthly practice return.

A. By the senior signalling sergeant instructor of the regiment on the day of practice.

Q. Describe briefly the annual signalling return, by whom and to whom is it rendered?

A. A return (B 225) rendered by the inspector of army signalling to the general officer, for transmission to the quarter-master general, shewing in order, the figure of merit and number of regiments and batteries inspected in the year, in the United Kingdom, Malta and Gibraltar.

Q. By whom is the annual inspection of signallers abroad carried out?

A. By a competent officer selected by the general in command of the station.

Q. How only is uniformity secured and a just comparison made between the signalling capabilities of different regiments?

A By applying the same test to all?

Q. What is a signalling test message, and to what length of message, the words of which are of an average length of five letters, is it considered equivalent?

A. The letters of the alphabet taken three times and broken up into groups of unequal lengths, written in block capitals, group under group; it is equivalent to a message of twenty words.

Q. How is the time taken to send a message converted into the rate *i.e.*, the number of words per minute?

A. Multiply 20 by 60 and divide by the time, in seconds, taken in sending the test, the result is "words a minute."

Q. Why are the numbers 20 by 60 always used in these calculations.

A. There being 60 seconds in a minute, and a test message being equal to 20 ordinary words, it will be apparent from the formula :—$\frac{60 \times 20}{n}$ where n=the number of seconds taken to send the message we shall be able to ascertain the rate of words per minute.

Q. How is the per-centage of letters, read correctly in a test message, calculated?

A. By subtracting from seventy-eight, *i.e.*, the number of letters in a test message, the mistakes and omissions made by the reader, and multiplying the result by $\frac{100}{78}$.

Q. Enumerate the various degrees of accuracy or otherwise assigned in reading test messages

A. Very accurate, ninety-seven per cent.; accurate, ninety-five; fairly accurate, ninety-three; inaccurate, ninety; very inaccurate, below ninety per cent.

Q. With reference to the Art. 1021 of the Rl. Warrant for Pay, &c., 1887, what is therein laid down?

A. That no regiment of Cavalry, or battalion of Infantry whose figure of merit (Army Form B. 225.) is below 319, and no battery of Artillery whose figure of merit is below 309 will be considered to have attained a satisfactory standard of efficiency A. O. $\frac{183}{89}$

Q. Under what conditions will all corps be disqualified for any prize, irrespective of their figure of merit?

A. When marked in the inspection return as a V. I. (very inaccurate A. O. $\frac{183}{89}$

Q In the annual return made by the Inspector of Army Signalling how are the regiments placed?

A. In order, according to their figure of merit.

Q. How is the average rate of sending of a regiment determined?

A. Each signaller is tested individually with the large flag and his rate of sending recorded, the average of the whole is the average rate of sending for the regiment.

Q. When using the large, small flags and lamp, what rate of sending must not be exceeded with them.

A. Ten words a minute with the large flag, sixteen with the small flag and lamp.

Q. Will credit be given for anything less than *nine* (*p. 78.*) words a minute in determining the figure of merit of a regiment?

A. No.

Q. How is the percentage of letters read correctly, with the large flag decided when determining the figure of merit of a regiment?

A. Each message sent with the large flag is read by one of the signallers and the mistakes made noted, the average of the whole is then taken as also the mistakes made in the transmitting message, from this is calculated the percentage of letters read correctly.

Q. Why is the method employed for determining the percentage of letters read correctly by a regiment a test of its sending as well as its reading capabilities.

A. Because it is difficult to attain to good reading with bad sending.

Q. What two things are noted in the transmitting test?

A. The rate at which the message is passed through it, and the errors made.

Q. Where are the errors made in a transmitting message included, when determining the figure of merit of a regiment?

A. In the average number of mistakes made by the signallers sending individually with the large flag.

Q. How are the signallers of a regiment tested with the small flag and lamp to determine the figure of merit of the regiment?

A. By a message sent on each by the assistant instructor to every signaller under examination.

Q. If a signaller send with the large flag in a less time than two minutes, will he be credited with the quicker rate?

A. No.

Q. What three numbers added together represent the speed, accuracy, and smartness with which the men of a regiment work a station?

A. The average rate of sending of the regiment with the large flag; the average of mistakes made when reading the large flag, including the errors in the message passed through a transmitting station; and the rate at which the message was passed through the latter station.

Q. Describe briefly what determines the figure of merit of a regiment.

A. The average regimental rate of sending with the large flag; the average of mistakes made when reading it, including the errors in the message passed through a transmitting station, as also the rate at which a message is passed through the latter station; together with the average rate at which the two messages on the small flag and lamp are sent, and the correctness with which they are read.

Q. What is the complement of signallers and supernumeraries for a cavalry regiment?

A. Four Non-Commissioned Officers and eight men, or four complete signal parties, and a supernumerary per troop.

Q. What is the complement of signallers for a battery of garrison artillery?

A. Four signalmen.

Q. What is the complement of signallers and supernumeraries for an infantry battalion?

A. Two Non-Commissioned Officers and four men, or two complete parties, and supernumeraries amounting to one per company.

RULES FOR CONDUCTING THE ANNUAL INSPECTION OF SIGNALLERS.

Q. Who at the annual inspection provides the test cards (containing four messages on each), and when should they be given to the senders and handed in?

A. The inspecting officer; they should not be given out till the senders are ready to send, and should be handed in with the papers directly the messages have been sent.

Q. At the annual inspection how are the two messages to be written by each pair of signallers?

A. On the same side of the paper so as to appear side by side.

Q. What should be noted on the paper provided *regimentally* (*p. 79*) for each reading pair of signallers at the annual inspection?

A. The name of the regiment, and under it the description of instrument used, the names of the senders and readers and the time in which the message is sent.

Q. How are the twelve "of cavalry," or eight or six "of infantry" formed up at the annual inspection for sending and reading with the large flag?

A. In pairs numbered off, the sending pairs being about fifteen paces apart and from 150 to 200 paces in front of the readers, with their backs to them; the readers facing towards the senders with their writers immediately facing them, having their backs to the senders.

Q. At the annual inspection on the word "Call up" what should each sender do?

A. Give the preparative and then lower his flag, holding the pole diagonally across the body.

Q. At the annual inspection what word of command follows the "Call up" and what should the senders then do?

A. The "Ready," when they should come at once to the "Prepare to signal," and on the command "Go." proceed at once with the message marking each group by lowering the flag.

Q. Are the groups of a test message to be acknowledged by the reader?

A. No, *he will merely say "Group" for information of his writer* (*p. 79.*)

Q. How is the inspecting officer informed of the completion of a message, to enable him to note the time?

A. By the sender's reader calling out his number.

Q. How is it arranged at the annual inspection so that every man sends a message with the large flag and reads one from it?

A. After two messages have been sent, the readers and senders cross over and change places, the readers becoming senders and the senders readers.

Q. How are the signallers placed at the annual inspection, in order to read the two messages off the small flag sent by the assistant instructor?

A. In pairs about 150 paces or more in rear of him and sufficiently far apart not to hear or interrupt each other.

Q. How are the messages read off the small flag written down?

A. On one side of the paper, side by side, in block capitals, group under group.

Q. How many stations are formed at the annual inspection for the purpose of transmitting messages with

the large flag and of how many men should they respectively consist?

A. Two terminal and one transmitting stations, each terminal consisting of two men, the transmitting, of three.

Q. How are the terminal and transmitting stations at the annual inspection placed?

A. The terminal stations level with each other about 50 paces apart, the transmitting station about 400 paces to the front of the terminals.

Q. How at the annual inspection are messages passed through a transmitting station?

A. Without any acknowledgement of groups *by flag or lamp* (*p.* 80), the sender at the transmitting station passing on the letters as the reader calls them out, No. 1 writing them down.

Q. At the annual inspection are the two messages sent through a transmitting station to originate from the same terminal station?

A. No, the sending terminal of the first message becomes the reading terminal of the second.

Q. How at the annual inspection, is a message sent through a transmitting station, timed?

A. From the moment when the sender at a terminal commences, until the sender at the transmitting station finishes.

Q. Which of the two messages sent through a transmitting station at the annual inspection is reckoned into the figure of merit?

A. The better one.

Q. At the annual inspection, what messages are sent with the small flag through a transmitting station and how and where are they entered?

A. One or two ordinary service messages, they are written in the book of forms, and are properly headed and filled in with prefix, code, office of origin, and number of words.

Q. In what manner are messages sent with the small flag through a transmitting station at the annual inspection?

A. According to the usual form of sending a message, each station having its own call signal.

Q. How at the annual inspection are signallers individually tested in the lamp?

A. By each man reading one of the two messages sent by the assistant instructor. *All messages sent faster than 1' 15" being reckoned as 1' 15".* (*p. 81.*)

Q. How are the messages read from the lamp at the annual inspection written down?

A. In pairs on one side of each paper.

Q. What is the penalty, from any cause whatever, if the readers fail to change?

A. Their performances are struck out and not reckoned in the figure of merit, either in flag or lamp, and the regiment is disqualified for a prize, *but the same pairs should work together during the inspection* (*p* 81).

Q. Describe briefly how a party of six signallers are placed for being tested with the large flag at the annual inspection.

A. Nos. 1, 2, and 4, 5, are posted in pairs from 150 to 200 paces apart, Nos. 3 and 6 being about twenty paces off, waiting their turn; as soon as No. 1 has sent, and No. 4 read, they will fall out Nos. 3 and 6 taking their places.

Q. When testing 6 signallers in working through a transmitting station at the annual inspection who can act as No. 1 at the transmitting station?

A. The assistant instructor or other capable man.

PART II.

QUESTIONS ON THE MANUAL FOR FIELD SERVICE.

Q. What establishment of Signallers, as laid down in Table XXI, Field Army Establishments, 1888, is allowed to an Army Corps in the field?

A. One mounted and one dismounted company.

Q. What is the personnel of the mounted and dismounted company of signallers allowed to an Army Corps in the field?

A. One officer (captain or lieutenant), one company sergeant-major, one sergeant, twenty-eight rank and file, one bâtman, and four drivers.

Q. What number of horses, private or provided under Allowance Regulations, are allowed to the officer who is in command of a mounted or dismounted company of signallers, respectively?

A. Three for the officer commanding the former, one for the latter.

Q. How many carts and draught horses are respectively allowed for the mounted and dismounted companies of signallers of an Army Corps?

A. Four carts and eight horses to each.

Q. By whom is the saddlery for the mounted company and the driver's horses and carts for the mounted and dismounted companies of signallers of an Army Corps provided?

A. The Army Service Corps.

Q. With what should the officer appointed to the command of a signalling company in the field, as soon as possible make himself acquainted?

A. He should by personal inspection ascertain the capabilities of the non-commissioned officers and men under his immediate command.

Q. How, and for what purposes is a signalling company for duty in the field told off?

A. Into sections (consisting of seven, non-commissioned officers and men) and sub-divided into half sections (consisting of three or four men); the former should furnish if necessary, the transmitting stations, the latter the terminals.

Q. Under what circumstances may it be necessary to furnish an escort for a signalling station?

A. When they are formed at some distance from the vicinity of troops.

Q. When may pack in preference to wheeled transport be used by signallers?

A. On hilly ground where carts could not be taken.

Q. Why should signallers in the field, be free from other duties than those of signalling?

A. Because their signalling work, as a rule, will commence immediately on arrival at a station.

Q. What should be the immediate duties of signallers on taking up a station in the field?

A. To open communication with other stations and make preparations for working at night, such as noting the bearings of the different stations, marking them by pickets, arranging for the making of gas, etc.

Q. Wherein are the numbers of men and horses of a signalling company formed for war, detailed?

A. In the latest tables of war establishments which have been published in Army Circulars.

Q. Wherein are the stores to be taken by a signalling company formed for war, detailed?

A. In the latest editions of the Equipment and Clothing Regulations.

Q. Wherein is the method of drawing and accounting for stores in the field, explained?

A. In the Regulations for the Supply of Stores to an Army in the Field.

Q. Should transport and stores accompany a force proceeding to its destination by sea, and if so what rations should the latter include?

A. Yes; two days biscuits and preserved meat, and three days groceries for use on landing.

Q. What detail of transport is used by a dismounted company of signallers, when wheeled or pack respectively is used?

A. In the former case, four carts and eight horses or mules; in the latter, eighteen pack animals.

Q. What detail of transport is used by a mounted company of signallers, when wheeled or pack transport respectively is used?

A. In the former case, four carts and eight horses or mules; in the latter, twenty-two pack animals.

Q. Who will arrange for the forage, cleaning, harnessing etc., of all transport for signalling equipment and signallers, whether by carts or mules?

A. The Army Service Corps.

Q. When may an additional man be told off to accompany each half section; is he to be a signaller?

A. When detached, and pack transport is used; he is not to be a signaller.

Q. To what are the transport duties of signallers in the field confined?

A. Loading and unloading the equipment and leading the mules.

Q. By whom are all repairs to carts and harness, and greasing of wheels to be carried out?

A. The Army Service Corps.

Q. What supply of rations should be taken on the person of every signaller on marching off in the morning, and with what object?

A. Some biscuit or bread in the haversack, and meat in

the mess tin to last during the march or battle until the carts come up, probably late in the day; and an "emergency" ration.

Q. By whose orders only, will the emergency ration supplied to every signaller on marching out be used, and to whom is a report to be made if it is consumed?

A. The general or other officer commanding the force on the spot, and if from dire necessity it is found necessary to use it, a report of the fact must be immediately made to the brigadier or general officer commanding the division.

Q. What rations, per man, should be carried in the carts or in the panniers on mules, and when are they to be issued?

A. One day's reserve ration of biscuits, meat and groceries in cases, one complete day's rations (fresh or preserved, according to circumstances) for issue on reaching the camping ground, and one day's groceries broken up for distribution on arrival in camp.

Q. Where is the reserve forage ration of 20lbs (issued only for draught horses) to be carried, and when may it be consumed?

A. In the carts; and only consumed when specially ordered.

Q. What ration, per horse, should be carried in the carts for issue on arrival in camp?

A. 12 lbs. of oats.

Q. Where is the forage carried for use on the march?

A. In nosebag and hay net.

Q. How are hay or grass, and wood supposed to be obtained by signallers?

A. As a rule locally, but under special circumstances the two former are carried by the Army Service Corps, an allowance of the latter to the extent of 1 lb. per man, being carried in the carts for kindling purposes.

Q. Is transport for water allowed to signallers?

A. No, it is supposed to be obtained locally, but every man should carry water or tea in his water-bottle on the march.

Q. Give a summary of rations, per man, of a party of signallers on marching off in the morning, how they are carried and when issued ?

A. An emergency ration for one day, and a half ration to last till the carts come up, both of these to be carried on the person, the former to be consumed only under special authority ; one complete day's rations, carried in the carts, for issue on arrival in camp ; one day's reserve ration of biscuit, meat and groceries in cases in carts or in the panniers of mules, one day's groceries carried in the same way for issue on reaching the camping ground.

Q. How is the ration, carried on the person of the signaller on marching off in the morning, to be provided ?

A. By a special issue on first leaving barracks or board ship.

Q. Give a summary of the forage taken with a party of signallers on marching off in the morning, how it is carried and when issued.

A. A half ration carried by each horse for use on the march ; a reserve ration 20lbs for draught horses only, to be carried in their carts and only eaten when specially ordered, and a ration of 12lbs oats per horse, to be carried in the carts, for issue on arrival in camp.

Q. How many days' rations, groceries, and forage should a party of signallers have with them on marching off in the morning ?

A. A $3\frac{1}{2}$ days' rations $\times$ 1 day's groceries : forage $1\frac{1}{2}$ for riding, $2\frac{1}{2}$ for draught horses.

Q. On signallers arriving at a camping ground, how and by whom should the wood for cooking and gas-making, and the grass for the horses, be as a rule procured ?

A. The former would be cut locally by a signaller acting

as cook; the Army Service Corps would arrange for the latter.

Q. How will each signalling station of the strength of a section or half section and not accompanied by a cart or pack animal be furnished with rations?

A. If possible from the nearest corps.

Q. How many rounds of ammunition should each signaller for whom a carbine is provided, carry?

A. Twenty.

Q. Should the officer commanding a signalling company require reserve ammunition, from whom will he demand it?

A. The senior artillery officer of the division in the field.

Q. Will the field kit of mounted and dismounted signalling companies be the same as for cavalry and infantry respectively?

A. Yes.

Q. What care should be taken by the officer commanding a signalling company in the field, with regard to replenishing the clothing and accoutrements that have been lost or worn out, belonging to the men of his company?

A. He should send requisitions for the articles to the Ordnance Store Depôt, as prescribed in the Regulations for the Supply of Stores to an Army in the Field.

Q. How, and for what reason should all worn out stores belonging to a signalling company, which have been replaced, be disposed of?

A. Under local authority, since the transport allowed is only sufficient to carry the stores detailed in the Tables of the Manual.

Q. Why should signallers in the field as far as possible take advantage of halts?

A. For the purpose of mending their clothes and repairing their accoutrements.

Q. To whom will a signalling company in the field be attached for veterinary arrangements?

A. The nearest troops.

Q. With what stores should each cart employed in signalling transport be equipped?

A. With such as are enumerated in Table 2, appendix II. Manual for Field Service—Army Signallers, page 12.

Q. Are the stores carried in carts for mounted companies, identical with those for use of dismounted companies?

A. Yes, in every detail.

Q. How may it be ascertained if the stores carried in a cart employed in signalling transport are present, &c.?

A. Among the stores carried therein should be an inventory board, on which will be written all the stores that the cart is supposed to carry inside and out.

Q. What is the weight of a cart employed in signalling transport complete, with its stores?

A. $8\frac{3}{4}$ cwt. or 968 lbs.

Q. If wheeled transport cannot be used, what stores should be carried by each mule used as signalling transport?

A. Such as are enumerated in Table 2, appendix II., Manual for Field Service—Army Signalling—page 13.

Q. What weight is thus provided to be carried by each mule?

A. Seventy-five lbs.

Q. What "additional gear" may be carried by a mule, when pack transport is used?

A. Axes, buckets, water, cords, forage, pegs picketing, ropes heel, and sacks corn,—showing an average extra weight on each mule of 1 lb. $8\frac{1}{2}$ oz.

Q. How should all articles of signalling equipment be packed?

A. In panniers, whether carried in carts or on mules—loads may also be carried in wicker panniers, attached to the hooks of the service pack saddle.

Q. What extraordinary precaution should be taken with signalling stores, and why?

A. Great care must be taken of all equipment and stores, and they must be kept clean and in a serviceable state, since it is difficult to replace equipment in the field—especially of all mallets, tent pegs, &c., as no spare articles are carried in signalling transport in the field.

Q. What precaution is it essential to observe in packing carts?

A. To see the stores are so packed as to balance the load so that it shall not be too heavy on the horse's back

Q. Do the same remarks apply to pack animals?

A. Arranging loads on pack animals can only be learned by practice, and the utmost care must be taken to adjust them evenly at starting.

Q. How may it generally be ascertained if the load on a mule is improperly adjusted?

A. If such be the case, they will be found to be raising their lips and twitching their noses.

Q. How may the loads on pack animals be best attached?

A. By first attaching the end of the leading rope to the lower fore-ring of the saddle, then pass it loosely through the lower hind-ring and through the upper hind-ring, or hook.

The load is then laid against the lower part of the saddle, and the end of the rope passed through the slack which hangs between the two lower rings; it is then passed through the upper fore-ring or hook and secured—and the load should not be lower than the side of the pack saddle, and under no circumstances ought it to touch the animal: as little as possible should be placed above the back, and the

whole should be finally secured by the surcingle passing over all and drawn tight.

Q. What is the average load, including equipment, carried by pack transport ?

A.

Donkeys	... ...	100 lbs.
Pack Bullocks	... ...	160 „
Stores and Mules	160 —	200 „
Camels	... 320 —	400 „
Elephants	... 800 —	1200 „

Q. Do these weights differ in any respect with regard to mules ?

A. Yes—male mules carry more weight than mares, but mares are more docile.

Q. What precaution must be taken with mules, as regards their use and as pack transport.

A. Pack mules have a habit of lying down and rolling whenever there is a halt ; care must therefore be taken to prevent this if the packs have not been removed.

Mules have also a habit of gnawing anything they can seize except metal.

Chains should be used instead of head ropes.

Q. Do mules suffer in any way by being used as pack transport ?

A. Yes, in hilly countries they suffer much from lacerated docks, cruppers must therefore be kept cleaned and well greased, and should not be tighter than is necessary to keep the saddle from slipping forward.

Q. At what rate should mules employed as pack transport, march ?

A. The same pace should be maintained throughout the march ; trotting or slow moving with long halts exhaust the animal.

Q. After a march should the saddles of pack mules be at once removed ?

A. No, the girths should be slackened, but only slightly

at first to allow of proper circulation before the saddles are removed.

Q. What sanitary precautions should then be taken?

A. The back, and all places capable of sustaining injury should be carefully examined, and immediate action taken to remedy any evil discovered.

Q. To obviate the distress of sore backs to pack transport, what precautions may be taken before taking the field?

A. To ascertain that the arrangement of the stuffing of the pads has been carefully carried out.

Q. How may this precaution be still further acted on when the field has been taken?

A. By securing, when practicable, that a saddle once fitted to an animal is not changed on any pretence whatever, and also if a mule loses flesh or strength from severe work and privation, comfort may be given by adding gradually and carefully to the stuffing of pads, but pads are not to be altered unnecessarily.

Q. What must be observed with reference to the feeding of mules?

A. That they eat almost anything, and are as whimsical as horses about drinking.

Q. How may a mule be at times induced to drink?

A. By putting a handful of freshly gathered grass in the water.

Q. What means are advocated for feeding mules?

A. Portable canvas mangers resting on cross-legs in preference to nosebags.

Q. What precautions should be taken with the panels of pack saddles?

A. They should be carefully freed from dirt or grit before being put on.

Q. What precautions should be taken in regard to the adjustment, &c., of the girth to pack animals?

A. The girth should be moderately tightened, but

sufficiently so as to keep the saddle in its place over ordinary ground.

When possible, they should be slightly slackened every hour or two.

Q. In what manner should a girth be adjusted to a mule ;

A. It should be crossed under the mule at the girth, and not under the belly.

Q. In what manner should the breast collar be adjusted to pack animals.

A. It should hang horizontally by the neck straps two inches above the points of the shoulder, so as to admit the breadth of the hand between the collar and the breast.

Q. How should the breeching be adjusted to pack animals ?

A. Kept taut, except when going up a steep incline ; it should be tightened when going down hill, and eased when going up steep hills.

In fitting the breeching, the hip straps should bring it about in line with its point of attachment to the saddle.

Q. How may the leading rein be adjusted to pack animals.

A. Fastened to the near side of the leading bit.

Q. Does this hold good in all cases ?

A. No ! if a driver has more than one animal to conduct they should be attached in succession to the breeching " D " of the animal in front.

Q. Should mules be tightly reined up ?

A. Never.

Q. What is the object of a web surcingle ?

A. In steadying the load it encircles.

Q. What precaution should be taken with regard to the load slings of pack animals ?

A. That they are not cut by sharp edges.

Q. How may this be obviated ?

A. By the application of a little hay or straw.

Q. Is one man sufficient to load a mule?

A. As a rule no, drivers will therefore assist one another.

Q. What further precaution may it be found necessary to take with reference to the loading of mules.

A. To tie a cloth over the animals eyes.

Q. What are "donkey bags"?

A. Large sacks, sown at the mouth, with an opening in the middle.

Q. What is their object.

A. To carry miscellaneous articles.

Q. How may they be conveniently carried?

A. Thrown across the saddle, and if filled evenly at either end, will ride easily and safely.

Q. How are the small arm ammunition boxes marked XII. slung on pack saddles.

A. By means of long grummets specially designed for slinging purposes.

Q. Enumerate briefy the articles of Signalling equipment carried in the field by the signallers of a half section detached.

A. Eight flags, six poles, heliograph, telescope and their stands, watch, cipher wheel, knife, pencils, field glasses and army signalling books, 119a and large size.

Q. What directions do the Manuals for Field Service Cavalry and Infantry give for the carriage of Signalling Stores on a Cavalry Regiment or Infantry Battalion taking the field?

A. One set of Signalling Apparatus weighing 100lbs, packed in two panniers, will be carried in the body of one of the wagons or carts conveying the head-quarter stores, or, if mules or pack-horses are used, in two panniers, on a mule.

QUESTIONS FROM THE QUEEN'S REGULATIONS.

Q. What signalling staff is appointed to each regiment of cavalry and battalion of infantry?

A. One officer as instructor, and two non-commissioned officers as assistant instructors. G.O. 50 / 1884

Q. What signalling staff is appointed to each lieutenant-colonel's command, and each battery of garrison artillery, stationed separately?

A. One non-commissioned officer. G.O. 50 / 1884

Q. What qualification is necessary for the appointment of instructor to the signalling staff of each regiment of cavalry, battery of artillery, or battalion of infantry?

A. A certificate from the School of Army Signalling, at Aldershot. G.O. 50 / 1884.

Q. What standard of efficiency in reading must officers and non-commissioned officers reach before being selected to attend classes of instruction at Aldershot?

A. Such a standard as will enable them to read at the rate of six words a minute off the small flag. G.O. 15 / 1888.

Q. When a corps is called upon to send an officer or non-commissioned officer to the School of Signalling, at Aldershot, what notice will be given by the inspector of signalling to the corps, and for what purpose?

A. Six weeks' notice in order to admit of sufficient time for the requisite preliminary training. G.O. 15 / 1885.

Q. Under what conditions are instructors in signalling to be struck off regimental duty?

A. When employed with a class, of instruction or on brigade practice. 44 / Gen. No. / 552.

Q. When vacancies occur in the signalling staff of a regiment, battery, or battalion, what steps should be taken, and with what object?

A. Such vacancies should be immediately reported, through the General Officer Commanding to the Inspector of Army Signalling at Aldershot, with a view to the training of other officers and non-commissioned officers as opportunity arises for the formation of classes by the Instructor of Army Signalling. $\frac{44}{\text{Gen. No.}\ 552.}$

Q. For what are the Instructors of Army Signalling specially held responsible ?

A. That the system of instruction as laid down in the manual and taught at the School of Army Signalling is strictly adhered to and carried out.

Q. Why is this identity in the system of signalling so absolutely essential ?

A. To enable the signallers of one corps at any time to communicate with those of another.

Q. When should classes be formed for the instruction of officers and non-commissioned officers at the School of Army Signalling ?

A. For officers, about the 15th March and 5th June; for non-commissioned officers about the 1st September.

Q. What should be done in corps provided with a certificated instructor ?

A. Classes formed as directed, and the system as laid down duly imparted.

Q. Where and how are requisitions for stationery for classes to be included ?

A. In the annual demand made by commanding officers in accordance with the regulations relating to allowances. (*Army Regulations, Vol. I., Part III.*)

Q. Of what numbers should each regimental class formed for instruction consist, and from what duties should they be relieved ?

A. One officer, three corporals, and six privates, who when under instruction or subsequently employed as signallers are to be relieved from all duties

which may be likely to interfere with their course of instruction.

Q. During what time of the year especially should the greatest care be taken by corps to advance the training of their signallers, and how may the best results be obtained from the instruction imparted?

A. The summer months; the course being as uninterrupted as possible. G.O. 115 85.

Q. When two or more regiments are quartered at the same station, under whose superintendence is the brigade practice to take place?

A. That of a regimental or specially selected instructor.

Q. On what does a proper discharge of duty in reference to army signalling depend, and for what reason?

A. On the efficiency and good conduct of each individual employed, arising from the fact that signallers being often placed in isolated positions are thereby frequently liable to have at any time a very heavy responsibility cast upon them.

Q. For what qualities should signallers be specially selected?

A. Steadiness of conduct, being quick and intelligent, able to read and write well, spell correctly, and possessing good eyesight.

Q. What non-commissioned officers and men should commanding officers allow to attend the Aldershot and regimental classes?

A. Those only who possess the necessary qualities.

Q. When may an instructor allow a man to be reported as duly qualified in signalling?

A. Only when perfectly fit to fulfil all the duties required of him.

Q. What number of non-commissioned officers and men, are to be specially selected in cavalry, artillery and infantry, for duty as signallers and supernumeraries?

A. Twelve non-commissioned officers or troopers from

each regiment of cavalry, six non-commissioned officers or privates from each battalion of infantry, and at least one supernumerary per troop, or company, in order to replace men becoming non-effective. In the Royal Artillery, four non-commissioned officers or rank and file from each battery of garrison artillery; but not more than two of these are to be non-commissioned officers.

G.O. 140 / 1881. G.O. 30 / 86. A.O. 193. / 88

Q. What is laid down by Q.R., Sec. VII., para. 25, with regard to the instruction of cavalry officers in signalling?

A. That no officer is to be dismissed his drill until he has been through a course of it.

Q. What is laid down by Q.R., Sec. VII., para. 9, with regard to officers acquiring a knowledge of army signalling?

A. That they are to be practically instructed in the mode of conducting it.

Q. When, and by whom are the signallers of each corps at home inspected, and on what will the inspecting officer report?

A. Annually, during the autumn, by the Inspector of Army Signalling, or his assistant, who will report on such points as may be deserving of notice, respecting the proficiency or otherwise of the corps inspected.

44 / Gen. No. / 587.

Q. What documents should be rendered by the inspecting officer after each inspection, and to whom?

A. A return on Army Form B 225, to the General Officer Commanding the District, for transmission to the Quartermaster-General. 44 / Gen. No. / 587.

Q. By whom is the annual inspection of signallers abroad to be carried out?

A. An officer duly qualified and specially selected each

year by the General Officer Commanding the Station.
44
Gen. No.
587.

Q. May furloughs be granted to signallers prior to the annual inspection ?

A. No. 38407
Q.R.
589.

Q. For how long a period previous to the annual inspection may signallers be excused, as far as possible, from other duties ?

A. Three months. 38407
Q.R.
589.

Q. What tests will be used for the examination of signallers at the annual inspection ?

A. Reading off, and sending with the large flag, care being taken the rate of ten words a minute is not exceeded, and reading messages sent by the assistant instructor with the small flag and lamp, at as fast a rate as can be accurately read within the prescribed limits of time. 38407
Q.R.
589.

Q. What return is forwarded monthly by Officers Commanding Corps to General Officers Commanding for the latter's transmission to the Inspector of Army Signalling Aldershot ?

A. Army Form B, 226, of which a duplicate should be prepared and retained by the corps concerned.
G.O. 157
1883.

Q. How are communications conducted by signal between Her Majesty's land forces and the Royal Navy ?

A. By spelling the words according to the Morse alphabet, as described in the manual of instruction in army signalling. G.O. 114
82

QUESTIONS FROM THE INFANTRY DRILL, 1889.

Q. On what occasions, on outpost duty, may signallers be employed ?

A. When time can be saved by their use. (p. 298).

Q. Should signallers accompany an advanced guard ?

A. Yes, and it is essential that they should be good signallers. (p. 243.)

Q. With what object should signallers accompany an advanced guard ?

A. With a view to establishing stations for the transmission of intelligence, by which much time and expenditure of orderlies will be saved. (p .243.)

Q. On what other occasions are good signallers invariably to be sent ?

A. With both reconnoitring and strong patrols. (p. 275.)

Q. Why should reconnoitring patrols be accompanied by good signallers ?

A. So that no delay may take place in the transmission of intelligence. (p. 287.)

Q. In the event of an encounter being anticipated, what object should signallers strive to attain.

A. By every exertion possible under such circumstances signallers should endeavour to maintain or open up communication with those in rear. (p. 243.)

Q. Can communication by army signalling be maintained on the march ?

A. It may be difficult of accomplishment but every effort should be made to carry it out. (p. 243.)

Q. When may signallers be advantageously employed in regard to intermediate communication ?

A. It may easily happen that one extremity of the screen of scouts may encounter the enemy without attracting the attention of the remainder, to prevent this, intermediate signallers should be employed. (p. 243.)

Q. Are the detachments of outposts, connected by means of patrols, to use in addition visual signalling to keep each other mutually informed on all matters concerning the enemy ?

A. Yes, when feasible. (p, 263.)

Q. After the commander of an outpost has received his instructions from the General Officer Commanding, what should be one of the first considerations he should have in view ?

A. The disposal of his signallers. (p. 281.)

Q. To what extent does the configuration of the country affect Army Signalling ?

A. If favourable the extent to which a well arranged scheme of visual signalling can be worked is only limited by the consideration of those engaged in it. (p. 287.)

Q. For what is Army Signalling especially well adapted ?

A. As being the means by which touch is kept by day and night between the main body and the various detachments which protect it whether on the halt or on the march. (p. 287.)

Q. What should Commanding Officers observe whilst on outpost duties with regard to the application of Army Signalling ?

A. As one object of outposts is to afford points of observation from which the movements of an enemy may be seen, and from which timely notice of these movements may be sent to the Commander of the Forces, Commanding Officers in making their dispositions will take into consideration the means that they have available for transmitting information. (p. 297—8.)

Q. In making such dispositions, what precautions should commanding officers particularly observe ?

A. The selection of a good position for observation, and to take care that the information at these points shall be readily conveyed to the piquets and thence to the Officer Commanding. (p. 298.)

Q. By whom and under whose directions are the signal stations of a force in the field disposed?

A. The Signalling Officer attached to the staff of the officer commanding whether he be in command of a battalion, brigade, or division. (p. 298.)

Q. By whom and when should the most suitable points for signal stations be noted?

A. By the Signalling Officer when the ground is being reconnoitred. (p. 298.)

Q. How should these signalling stations be located?

A. They should, if possible, be as near the ordinary lines of communication between the different portions of the outpost. (p. 298.)

Q. Should signallers be attached to the advanced post of a line of defence, and if so, with what object?

A. Generally to communicate the movements of the enemy from time to time, and to enable the commander of the defending force to issue his instructions to the advanced post and reconnoitring parties. (p. 397.)

Q. In marching past, what position will signallers take?

A. When not in the ranks, two deep, two paces behind the pioneers. (p. 440.)

Q. Are trained signallers to be put through a course of military training?

A. Yes. (p. 495.)

Q. How is this to be effected having due regard to their signalling duties?

A. They may all be attached to one company, or half at a time to two companies, so as to interfere as little as possible with their signalling duties. (p. 495.)

THE ROYAL MARINES.

Q. What signalling staff is appointed to each of the four divisions of Royal Marine Forces?

A. One officer as instructor, and two non-commissioned officers as assistant instructors.

Q. What member of the signalling staff in each division receives signalling pay, state amount, and how it is restricted?

A. The non-commissioned officer appointed to perform the duties of senior assistant instructor, receives 6d. a day for five days in the week, the total period not to exceed two hundred and sixty days in each year.

R.M.O. circular $\frac{2253}{88}$

Q. Do the instructions as laid down for guidance in the manual of instructions in Army Signalling, and Queen's Regulations and Orders for the Army, &c, govern the necessary qualification and standard of efficiency as regards the officers, non-commissioned officers, and men of the Royal Marine forces?

A. Yes, in every detail.

Q. In awarding prizes to signallers for the annual competition, how many men are reckoned to a division of Royal Marines?

A. Twelve.

Q. How many prize grades are there for signallers in the Royal Marine Forces and what number of men compose each of them?

A. Three with eight in each, and one with twenty four.

Q. How are the prizes distributed—

A. 1st Prize. To the two non-commissioned officers or men who obtain the highest standard of efficiency at their division for the year in which they qualify for efficient signallers, £2 each and a badge of crossed flags worked in worsted.

2nd Prize. To the two non-commissioned officers or men who obtain the next highest standard of efficiency at their division for the year in which they qualify as efficient signallers, £1 15s. each and a badge of crossed flags worked in worsted.

3RD PRIZE. To the two non-commissioned officers or men who obtain the next highest standard of efficiency at their division for the year in which they qualify as efficient signallers, £1 10s. each and a badge of crossed flags worked in worsted.

4TH PRIZE. To the six signallers highest in order of merit at each division for the year provided they each qualify as "efficient" and are not entitled to any other prize under these articles, 10s. each and a badge of crossed flags worked in worsted.

Q. To whom are these prizes open?

A. To all non-commissioned officers and men of the Royal Marine Forces who during the year pass through the signalling course at their respective head-quarters, whether afterwards embarked or not.

YEOMANRY (REGULATIONS, 1885), AND VOLUNTEERS (REGULATIONS, 1887).

Q. What opportunities are afforded to the officers and non-commissioned officers of Yeomanry of acquiring a knowledge of Army Signalling?

A. They may attend, under the Volunteer Regulations, the classes of instruction formed by the General Officers Commanding Districts. $\frac{\text{G O } 313}{1888.}$

Q. Under what conditions will officers and non-commissioned officers of Yeomanry attend classes for instruction in Army Signalling?

A. Under the conditions laid down for officers and non-commissioned officers of Volunteers. $\frac{\text{G O } 313}{1888.}$

Q. Who only in the Yeomanry and Volunteers (Infantry and Artillery) are entitled, if duly qualified, to signallers' badges?

A. Two assistant instructors and twelve signallers per

regiment of Yeomanry; two assistant instructors and six signallers per battalion of Infantry; one assistant instructor and four signallers per battery of Artillery.

Q. How often will classes be formed for the instruction of Officers and non-commissioned officers of Volunteers, etc., if a sufficient number of candidates are forthcoming?

A. Twice in the year at the undermentioned stations:—
A.O. 318
1888.

District.	Place of Assembly.	Date of Inspection by Officer from School of Signalling.
Northern ...	Manchester, Preston	22nd April to 15th May. 22nd Oct. to 15th Nov.
Eastern ...	Colchester, Norwich	1st April to 15th April. 1st Oct. to 15th Oct.
Western ...	Plymouth, Pembroke Dock	7th March to 20th March. 7th Sept. to 20th Sept.
Southern ...	Portsmouth ...	11th Feb. to 24th Feb. 11th Aug. to 24th Aug.
Chatham ...	Chatham	24th Jan. to 31st Jan. 24th July to 31st July.
S. Eastern ...	Dover, Shorncliffe ...	1st Feb. to 10th Feb. 1st Aug. to 10th Aug.
Home	London, Windsor ...	1st Jan. to 10th Jan. 1st July to 10th July.
Woolwich ...	Woolwich	11th Jan. to 17th Jan. 11th July to 17th July.
Aldershot ...	Aldershot	1st June to 30th June. 1st Dec. to 30th Dec.
N. British ...	Edinburgh, Glasgow	15th May to 30th May. 15th Nov. to 30th Nov.

Q. Of what numbers should each Volunteer signalling class consist?

A. Not less than 8 or more than 20 officers, and non-commissioned officers. A.O. 318
1888.

Q. For what duration of time must each Volunteer signalling class last?

A. Ninety-one days. A.O. 318 1888.

Q. By whom, and under whose supervision will the instruction of a class composed of Volunteers, etc., be carried out?

A. The assistant instructor of a regular regiment or battalion at the station, under the supervision of a District or Regimental Signalling Officer. A.O. 318 1888.

Q. What steps will be taken by a Volunteer corps, if there is no qualified officer on the spot to conduct the examination of its signallers, in order that no expense be entailed on the public?

A. Arrangements will be made by the corps, to send its signallers to an examining officer. A.O. 318 1888.

Q. To whom should the names of Volunteer officers and non-commissioned officers, desirous of attending an Army Signalling Class, be sent?

A. To the General Officer Commanding the District. A.O. 318 1888.

Q. Who will assemble the Volunteer classes for instruction in Army Signalling, detail the signalling officer to superintend it, and the regiment or battalion that is to furnish the Assistant Instructor?

A. The General Officer Commanding the District. A.O. 318 1888.

Q. To whom will the assembly of a class of Volunteers, etc., for instruction in Army Signalling, be notified?

A. The Inspector of Army Signalling, Aldershot. A.O. 318 1888.

Q. What number of attendances must applicants engage to make who join Volunteer classes for instruction in Army Signalling?

A. At least three a week. A.O.318 1888.

Q. At what time should the instruction of a class of Volunteers, etc., in Army Signalling be carried on?

A. In the evening, or at such times as will be most convenient to those attending. A.O. 318 1888.

Q. Who will inspect the classes of Volunteers, etc., and grant certificates to those found qualified?

A. An officer from the School of Army Signalling at Aldershot. A.O. 318 1888.

Q. What emolument is the Assistant Instructor in Signalling, appointed to instruct a class of Volunteers, etc., entitled to, and in what manner should he be paid?

A. One shilling a day, contributed by each officer and non-commissioned officer attending the class in equal proportions. A.O. 318 1888.

Q. How will the material for the use of signalling classes of Volunteers, etc., under instruction, be provided?

A. A certain number of flags, poles, and bull's-eye lamps, will be issued to each of the stations where it is directed such classes are to be formed. A.O. 318 1888.

Q. What opportunities will be afforded to Volunteers, etc., who attend classes of instruction in Army Signalling for acquiring a knowledge of the heliograph and lime light respectively?

A. They will be instructed in their use whenever they can be spared from the regular service. A.O. 318 1888.

Q. Where and when will the inspection of signalling classes composed of Volunteers, etc., take place?

A. If possible at the places in the Districts where it is laid down classes are to assemble, and, as far as possible on the dates specified. A.O. 318 1888.

Q. To whom does the Commanding Officer of a Volunteer Corps wishing to wear signalling badges apply, and for what purpose?

A. The General Officer Commanding the District, in order that he may appoint an officer holding an instruc-

tor's certificate from the School of Army Signalling at Aldershot to examine the corps.

Q. Who is held responsible that signallers' badges are not worn by men of a Volunteer corps, unless the proper authority has been obtained from the General Officer Commanding the District?

A. The Commanding Officer of the corps.

Q. What description of badges are issued to the signallers of a Volunteer corps, and where are they worn by the assistant instructors and signallers respectively?

A. Flags worked in worsted (in no case in gold) on cloth the colour of the tunic, and worn by the assistant instructors on the right arm above the chevron; by the signallers on the left arm below the elbow, and above all other badges.

Q. How are signalling badges to be worn in the Volunteer Forces?

A. In a similar manner as worn in the Regular Forces. They will be worked on cloth, the colour of the tunic, and in no case will they be worked in gold.

Q. Will signallers of Volunteer corps in possession of badges, who on re-examination fail to reach a satisfactory standard, be entitled to the re-issue of badges.

A. No.

Q. How and to whom does the officer appointed to examine a volunteer corps in signalling, report?

A. Direct to the Inspector of Army Signalling at Aldershot.

Q. On the receipt of the report of the officer appointed to examine a volunteer corps in signalling, what steps does the Inspector of Army Signalling take?

A. He notifies to the general officer commanding the district if it is desirable or otherwise to issue badges to the corps in question.

Q. What qualification is necessary to enable the signallers of a volunteer corps to wear badges?

A. A satisfactory standard of efficiency.

Q. At whose cost are signallers' badges to be provided, whose property do they become, and what is done with them at the end of the volunteer year?

A. Badges will be provided at the cost, and be the property of the corps, and will be returned into store at the end of the Volunteer year in which they are worn.

Q. How long are volunteer signallers, examined between 1st November and 1st May, and the 1st May and 31st October respectively, to wear their badges?

A. In the former case, to the end of the volunteer year (31st October) in which they are examined; in the latter, for the succeeding volunteer year commencing 1st November.

Q. How frequently may the inspections of Volunteer corps in signalling be held, and what period at least must elapse between them?

A. Not oftener than once a year, with an interval of at least six months.

Q. In the examination for and award of signalling badges is any expense whatever to the public to be entailed?

A. None, it is to be clearly understood that if there is no qualified officer on the spot, to conduct the necessary examination, the corps concerned must arrange for the signallers to be sent to the examining officer for the purpose.

Q. What officers and N.C.O.'s of Volunteers are entitled to the special capitation allowance of £1 10s. for signalling?

A. Those who are in possession of certificates showing they have passed their examination in signalling for every year in which they earn the ordinary capitation allowance; but not exceeding two officers and two N.C.O.'s in each corps.

Q. Is any exception made to this rule?

A. Yes, this especial capitation allowance will be granted to all officers who have obtained certificates prior to the 1st March, 1889.

Q. On what Form should the claim for the special capitation allowance for signalling be made ?

A. Army Form M 1416.

Q. What proficiency is required of Volunteer officers to entitle them to a signalling certificate ?

A. (*a*) Correct reading from, and sending with, the large flag at the rate of nine words per minute.

(*b*) Small flag twelve words.

Bulls-eye lantern ten words.

(*c*) Fair knowledge of heliograph and limelight.

(*d*) Thoroughly understanding the manual of instruction.

Q. When, and under whose instructions are the examinations for Volunteer officers in army signalling for a certificate held ?

A. From time to time, under the instructions of the Inspector of Army Signalling.

Q. Who alone is empowered to issue in person or by deputy, certificates to successful candidates of Volunteers ?

A. The Inspector of Army Signalling.

EXTRA DUTY PAY, PRIZES, DRESS, &c.

EXTRA DUTY PAY.

Q. With whose special sanction do signallers, at fixed stations with an Army in the field, or under special circumstances, receive extra duty pay ?

A. The Secretary of State.

Q. What are the rates of extra duty pay for signallers at fixed stations with an army in the field, or under special circumstances, and how are the scales of pay regulated ?

A. They vary from 1/- a week, to from 4d. to 1/- a day, according to the qualification of the men and the nature and amount of duties they perform.

Q. What member of the signalling staff in each corps receives signalling pay, and how is it's issue restricted?

A. The senior non-commissioned officer appointed assistant instructor, who receives 6d. for each day on which he is employed in imparting instruction in signalling limited to 130 days in each year, for each Regiment, Battalion, or Battery.

PRIZES.

Q. In awarding prizes to signallers for the annual competition, how many men are reckoned to a Regiment of Cavalry, Battalion of Infantry, and Battery of Garrison Artillery?

A. Twelve to the Cavalry, six to the Infantry, and four to a battery of Artillery.

Q. Is every signaller who is entitled to a money prize, entitled to wear the badge of crossed flags worked in worsted?

A. Yes.

Q. How many prize grades are there for Cavalry Signallers and of what number of men is each composed?

A. Three; each in order of merit, consisting of the twenty-four Signallers of two Regiments.

Q. What are the money values of the prizes awarded to each Cavalry Signaller of the three grades?

A. £2, £1 15s., and £1 10s. respectively.

Q. How many prize grades are there for Garrison Artillery Signallers in the United Kingdom, and of what number of men is each composed?

A. Three; each in order of merit, consisting of the twelve Signallers of three Batteries.

Q. What are the money values of the prizes awarded to each

Garrison Artillery Signaller of the three grades?

A. £2, £1 15s., and £1 10s. respectively.

Q. How many prize grades are there for Infantry Signallers in the United Kingdom, and of what number of men are each composed?

A. Three; each in order of merit, consisting of the thirty-six Signallers of six Battalions.

Q. What are the money values of the prizes awarded to each Infantry Signaller of the three grades?

A. £2, £1 15s., and £1 10s. respectively.

Q. What is the money value of the prize awarded to each of the four Signallers of the Battery of Artillery, and to each of the six Signallers of the Battalion respectively, highest in order of merit at Malta and Gibraltar.

A. £1 15s.

Q. What is the money value of the prize awarded to each of the four Signallers of the Battery of Royal Malta Artillery, highest in order of merit.

A. £1 10s.

Q. Are supernumeraries entitled to the prize of 15/-, granted to each soldier within the recognized establishment of Signallers who may qualify in any year and not be entitled to any other prize?

A. No.

Q. Are Signallers necessarily entitled to a prize, if by the results of the inspection they rank as members of a prize grade?

A. No, they must also attain a satisfactory standard.

Q. In what Colonial stations only, are the Battalions and Batteries allowed to compete for the first, second, or third prizes for signalling.

A. Malta and Gibraltar.

Q. Are soldiers of batteries, troops, or companies, who, by reason of imprisonment or misconduct, cannot com-

pete for prizes, and are consequently separately practised, to receive prizes ?

A. No.

Q. When does a soldier forfeit his right to a signalling prize ?

A. If between the date of the annual competition and receipt of authority for the issue of the prize, he is sentenced by civil court to imprisonment exceeding six months, or discharge with ignominy, or if he commits any offence under section 17, 18, A.A. 81.

Q. Can a prize for signalling, forfeited by a soldier for misconduct, be issued to another man ?

A. No.

Q. Where are the signalling prizes earned by deserters credited ?

A. To their estates.

Q. What directions do the financial instructions give, with respect to the payment of signaller's prizes, and supporting the charges ?

A. That they are to be paid each year on publication of the general order, shewing the relative efficiency of the corps, the charges being supported by a reference to the general order, by a statement of the names of the men, and by proof of payment.

DRESS. (CLOTHING REGULATIONS, 1887.)

Q. What distinctive badges are worn by Regimental Assistant Instructors in signalling ?

A. Crossed flags worked in gold worn on the right arm above the Chevron. (p. 295).

Q. Is there any exception or variation to this rule ?

A. Yes, an Assistant Instructor of Signalling on the Staff wears, in addition, a crown in gold above the cross flags, (a crown on great coat) and should a Regimental Assistant Instructor be a Colour-Sergeant, the badge worked in gold will be worn on the left forearm. (p. 313 & 315.)

Q. Are Non-Commissioned Officers and men who have passed the qualifying course for Instructors, allowed to wear badges?

A. Not unless they be Battalion Signallers for the current year. (p. 1.)

Q. What distinctive badges are worn by Battalion Signallers?

A. Crossed flags in worsted (Household Cavalry excepted, which are worked in gold) worn on the left arm below the elbow, and above all other badges. (p. 292.)

Q. Do these rules and regulations obtain for all branches of Her Majesty's Service?

A. Yes. (p.1.)

Q. What periodical issues are made to the School of Assistant Instructors at the School of Army Signalling who require to be mounted occasionally?

A. One pair cloth pantaloons, one pair knee boots biennally; one pair gloves annually, one pair of jack spurs every five years, in lieu of one pair of tweed trousers biennally, one pair of mitts biennally, one pair of ankle boots (October supply) annually.

Q. What become of the badges for good signalling supplied for the tunics used biennally?

A. They will not be transferred from the winners of one year to those of the succeeding year, but will be retained by the winners of them as their property although they will not be worn after the period fixed for the wearer of such badges shall have expired. (p. 25).

Q. How are signalling badges to be worn by Battalion Signallers?

A. They will be worn on the left arm, on tunics or dress jackets and frocks, or undress jackets, below the elbow, and above all other badges worn on that arm. (p. 292).

Q. When will such badges not be worn?

A. On cotton, drill, canvas, or duck, nor on recruit's serge frocks. (p. 292).

FORMS AND BOOKS.

Q. What signalling books are laid down as sufficient for three months, for the use of each of Artillery, Staff, and for Batteries of Artillery and Columns of Ammunition in the Field?

A. Military Telegraph and Signalling Message Book (Army Form 119 B.) Three to be issued to each of the following: Colonel, Commanding Corps of Artillery; Lieut.-Colonel, Commanding Corps R.H.A.: Lieut.-Colonel Commanding Field Artillery; Lieut. Colonel Commanding Corps Ammunition Reserve; and one each to the several Horse and Field Batteries and Ammunition Column.

(*Manual for Field Service, R.A., 1888.*)

Q. What signalling books are laid down as sufficient for three months for a Regiment of Cavalry, or a Battalion of Infantry in the Field.

A. Military Telegraph and Message Book (119 A) three to each; Military Telegraph and Signalling Book (119 A), one to each.

Q. What signalling books are laid down as sufficient for three months, for the regimental use of the Head Quarters Army Service Corps with an Army Corps, and for Companies of A.S.C. in the Field.

A. Military Telegraph and Signalling Book (double size) Field Service (119 B) Stationery Boxes (2) each Company (1). Appendix to $\frac{\text{A.O. } 17}{1888.}$

Q. What Army Forms are in common use amongst Signalling Staff?

A. No. 4.—Equipment A.S. Companies, for use of School of Signalling only, excepting when required for Field Service.

A 119.—Military Telegraph and Message Book.

A 2002.—Map Message, No. 1.

A 2003.— „ „ No. 2.

B 119.—Military Telegraph and Signalling Book (double size), Field Service.
B 225.—Report of Signalmen Inspected.
B 226.—Instruction in Signalling (Regimental). Return of Monthly Signalling Implements.
G 1040.—Receipt and Delivery Voucher.
G 1041.—Signalling Implements: Requisition for.
O. 1769—Signalmen Employed by Engineer Department: Pay of (monthly).

THE HELIOGRAPH.

Q. When laying the heliograph with the aid of the duplex how may the latter be best manipulated?

A. By holding it with both hands just below its centre, thumbs to the rear, first, second, and third fingers to the front; first and second resting on the rim of the duplex mirror, third finger on its U-frame. The inclination and direction of the duplex is then regulated by means of the thumbs and first and second fingers of either hand working against one another.

Q. When sending with the Heliograph, how should the key be held?

A. With the cushions of the forefinger and second finger pressing the key, one on either side of the vertical rod. Holding the vertical rod like a penholder gives great unsteadiness, and jars the instrument.

Q. Describe how to extract from the case the extra mirror supplied with a heliograph.

A. Take out the screws on either side of the leather case that hold the padded partition in position and lift it out; remove the screws and slips of wood at the top of the partition, and gently draw out the mirror by means of the tape tag.

Q. How are mirrors generally broken?

A. By the heliograph being blown over by wind, or

upset by signallers when the tripod has not been properly secured, or while being put to an improper use, *i.e.* to shave by, etc.

Q. Whose duty is it to fit a new mirror to a heliograph ?

A. The armourer-sergeant. In the field, or in isolated positions, the most experienced person on the spot.

Q. What is the test of a good mirror ?

A. (*a*) The non-distortion of distant objects looked at very obliquely in it; (*b*) the more highly polished the surface the brighter the reflection; (*c*) mirrors that look the darkest are, as a rule, the best; (*d*) good mirrors throw a close round pattern, bad ones disperse the light and show all shapes of patterns—elongated, pear-shaped, etc.

Q. Describe the process of replacing a broken mirror by a new one.

A. Lift off the jointed arm, remove the screws securing the claw which holds the ball to the rim of the mirror, take out the trunnion screws and remove the mirror from the U-frame; place it on its face and take out the small screws securing the back, put in the new mirror and screw on the back so that the latter presses against the corks that keep the mirror steady.

Q. Describe the process of stripping the base of the U-frame to clean the plates.

A. Lift off the jointed arm, place the mirror on its face and take out the screws holding the tangent box, pressing the face of it while doing so with the first and second fingers of the left hand, to prevent the box springing up with a jerk; remove the large screw and washer at the base of the plate and the latter will come out. When replacing, be careful not to turn the base screw too tightly.

Q. For what other purpose besides that of cleaning the plates may it be necessary to strip the base of the U-frame?

A. To tighten the brass cylinder that holds the pedestal on which the lever arm works.

Q. What is the cause of the tangent screw not communicating a horizontal movement to the mirror?

A. Either the thread is worn out, dirt or fine sand have clogged it, or the revolving plates; or the base screw has been turned too tightly.

Q. Enumerate the causes of an unsteady or "splashy" light.

A. (*a*) The mirror not being steady in its round frame (this usually occurs when a new mirror has been badly put in); (*b*) the pedestal of the lever arm being loose; (*c*) with heliographs that have been long in use, an interval at the lever end of the key rod; (*d*) the screws in the tripod round the head or along the legs being loose; (*e*) the sender himself being unsteady; (*f*) the thread of the vertical rod being worn.

Q. What causes the interval at the telescope joint of the lever end of the key rod?

A. The small screw under the key works in a hollow in the telescope joint of the key rod; continual turning of the key thins the point of the screw which then no longer bites the hollow, thus causing an interval and consequent unsteadiness of the shadow spot.

Q. Describe how to remedy an interval at the telescope joint of the key rod.

A. Turn the heliograph base upwards, give the ebony key a tap and it will slip down the rod, remove the small screw and, if a fresh one is not available, rub its end flat, replace, and screw home, it will then bite the hollow properly; another alternative is to wad the interval with string, &c.

Q. What exact amount of play with a service mirror is sufficient to throw the light on and off a distant station?

A. One thirtieth of an inch.

Q. What purpose will the heliograph often answer

although intermittent sunshine may preclude its continuous use?

A. That of demonstrating the position of a moving station.

Q. How should the heliograph be set up with reference to the tangent screw?

A. So that the latter can be conveniently worked with the left hand.

Q. How may a heliograph be advantageously set up with with regard to its background?

A. In such a manner that its light, if possible, be read off a dark background.

Q. How should the attention of a distant station be attracted with the heliograph, if its position is unknown?

A. By releasing the clamping screw holding the vertical rod, thus enabling the operator to work the mirror through its greatest inclination, and at the same time by turning the tangent screw.

Q. When aligning the heliograph by means of the hole in the back, what must be done with the sighting plate?

A. It will be turned sideways so that the distant station may be seen.

Q. By what two methods can signals be made when using light as the medium of transmission, and which is adopted in the Army.

A. By making the flashes of light, or the long and short intervals between them, represent the dots and dashes of the morse code; the former is the method in use in the Army.

Q. Is it necessary to interrupt the signalling, while turning the screws which gives the mirror its required alteration to keep the light on the distant station; how often should this movement take place?

A. No: every 15 to 20 seconds.

Q. On what is the heliograph aligned and how is the alignment verified?

A. On the exposed light of the distant station; the correctness of the alignment will be tested by looking above the sighting line and to the right or left of it when the reflections should be in a true line, vertically and horizontally.

Q. What number of degrees may the angle of light made by the sun, mirror, and the former's reflection to the distant station, contain, before it will be necessary to use the duplex mirror?

A. 120°

Q. How is a measurement of the lateral extent of the flash from a plane mirror determined?

A. By dividing by 107 the distance of the observer from the mirror.

Q. Why is it an advantage, when working a station, to place the sender a little in advance of the man reading answers?

A. In order that the latter may keep an eye on the transmission, and if necessary, correct the sender in a mistake he is unconsciously making.

Q. What does the leather case contain besides the mirror, jointed arm, duplex, and sighting vane?

A. A spare mirror, oil bottle, two turn screws, spare sighting spots, and an instrument for tightening the joints in the sighting vane.

Q. In the field how is it most convenient to carry the case and tripod when riding?

A. The case slung over the back, the tripod fastened across the saddle to the "D's."

Q. How is the heliograph stand carried in mounted corps?

A. In a leather bucket.

Q. Previous to taking up a fresh position, or when work is finished, should the mirror be replaced in its case?

A. Yes, as a rule, it is never to be carried screwed on the tripod, or to be left on it for any considerable time, or it may become fastened.

Q. When should signallers not remove the mirror from the tripod, previous to occupying a new station ?

A. In the field, during an action, etc.; *i.e.* if a fresh position has to be rapidly taken up.

Q. Should a signaller be unable to unscrew the mirror from the tripod, to whom does he take it, and how is its becoming fast best prevented ?

A. To the armourer-sergeant, to admit of the screw of the tripod being carefully oiled.

Q. What articles of equipment are useful for lashing the tripod to ?

A. A tent-peg, or handle of a bucket filled with sand.

Q. In addition to lashing the tripod, what forms a good protection for the heliograph against the wind ?

A. Walls hastily constructed of biscuit tins filled with sand, earth, etc., clear of the lines of communication. This protection is especially useful when a prevailing wind exists from one quarter.

Q. Where admissible, what should be done as regards the protection and concealment of signallers in the field ?

A. Every available means should be adopted for their security, and if possible concealment, observing that signallers are difficult to replace in the field.

Q. How may this be best effected ?

A. By the throwing up of banks of earth towards the enemy, or such other means as may from time to time suggest themselves.

Q. What is a good rate of sending in the field between two stations with the heliograph ?

A. Between twelve and thirteen words a minute.

Q. What physical reason is there why the rate of reading the heliograph should not equal that of the telegraph sounder ?

A. The fact that the ear throws off impressions more quickly than the eye.

Q. How may a class be advantageously instructed to send with a heliograph ?

A. By directing them to send on to a spot on a wall, or sheet of newspaper about ten yards distant, and by so doing demonstrate to them the advantage of keeping the shadow spot continually on the sighting spot, to make the reflection strike the same place.

Q. Describe how a class may be advantageously instructed to read the heliograph ?

A. Set up two heliographs about two hundred yards apart, the class to be about ten yards to the right or left and parallel with the heliograph to be used for sending with, and direct them to read off the reflections from the further heliograph. In setting the reflecting mirror on the class, be careful to shade the former from the sun so that the reflected spot is thrown on the class and not the true sun spot. By the above plan much time is saved which would be occupied by the out station going to a distance; the class is kept under supervision; and the sender can hear how the men are reading and regulate his pace accordingly.

Q. In what case besides that of instructing a class might it be desirable to read the reflection from one heliograph off another, and how would they be placed ?

A. In a position or fort closely invested, where it was necessary to keep the signalmen under cover, one mirror would be placed on the parapet and set on the distant station by means of the light from the sending heliograph placed beneath the parapet.

Q. How does a signaller when working with the heliograph know if it is past noon ?

A. By his having to work the key from right to left.

Q. Up to what distance may the ordinary service mirror be read ?

A. It greatly depends on the state of the atmosphere

satisfactory work cannot be correctly reckoned upon beyond twenty-five miles.

Q. When screwing on the heliograph or putting lenses in position how is the screw made to take the thread at once?

A. By giving a half turn against the thread previous to screwing on.

MAP SIGNALLING.

Q. In map signalling on what does the accuracy with which the exact position the features are fixed depend?

A. The size of the squares.

Q. For what purpose may map signalling be useful besides that of giving a general idea of the country?

A. In the case of a station wishing to take up a fresh position, it could inform the other station the exact spot proposed to be occupied, and similarly the position of an enemy's outpost, &c., might be exactly fixed.

Q. What do you understand by map signalling?

A. The transmitting by telegraph, or signal, any drawing or plan.

Q. Describe briefly the principle of map signalling?

A. The sender has a form containing squares sub-divided into smaller squares, lettered horizontally and vertically, the form being further spaced with lines with marginal letters to expediate reference; the features are denoted by the letters of the squares they are in or through which they pass (in every case preceded by a marginal letter.) The receiver has a form similarly sub-divided on which he fills in in the details from the combinations signalled.

Q. How is a map message sent?

A. It is transmitted in proper message form, the receiving station repeating each group to the sending station in a similar way to that adopted when sending cipher.

Q. How are the map messages Nos. 1 and 2, Army forms A, 2002 and 2003 respectively used?

A. Sketches for messaging should be drawn on Form No. 1. If drawn on any other paper No. 2 should be superimposed.

Q. Should a map be completed before being messaged?

A. Yes.

Q. For what are the map message Forms A, 2002 and 2003 employed, where are the instructions for their use given, and how may they be obtained.

A. They are used to faciliate the transmission of topographical information by telegraph or signal, instructions for their use are printed on each of the forms which may be obtained in a similar manner as laid down for other Army Forms.

Q. What care should be taken when messaging various details such as rivers, woods, roads, contours, &c.

A. That they be kept as distinct as possible, and messaged separately under their respective headings.

Q. In what order should a map message be invariably sent?

A. Short title, scale, north point, and body of message.

Q. In map messaging how should the scale be expressed and the north point messaged?

A. The former as miles (to an inch), inches (to a mile) or by the denominator of the R.F. The latter as true or magnetic.

Q. Define the terms group and combination as used in map messaging, how is the termination of the latter signified?

A. A group consists of three letters, two or more groups are called a combination; by being terminated by the break signal **B.S.**

Q. In map messaging, how is the position of each point fixed and where is it plotted?

A. By a group of three letters, sent and described in the order of gradation of type and plotted in the centre of the square indicated.

Q. Should the size of the sketch render necessary the use

of more than one map message form, what points should be attended to?

A. That the whole of one sheet be messaged before another be commenced; that the sheets are neatly cut and carefully joined; that the receiver is warned when to commence a new sheet, and whether N., S., E. or W.

Q. When fixing positions or messaging additional information on maps already in possession of sender and receiver, but which are not prepared on army forms, which message form will be used, and how will the sender and receiver respectively proceed?

A. Form No. 2. Which is transparent. The sender will place it in a convenient position on his map, select two or three easily identified points, and message their names and their co-ordinates to the receiver who will adjust, by them, his form (on the map in his possession) in a similar position.

Q. In using the transparent Form No. 2, should the map upon which it is superimposed be too large, what method will be adopted?

A. The map should be divided by lines into squares, conveniently situated, of the same size as the form; subsequent forms should be neatly cut and carefully joined, and the receiver warned when to commence a new form, and whether N., S., E. or W.

OBSERVATORIES.

Q. May observatories be employed in the field, as well as at besieged or invested places, and what advantage do they offer?

A. Yes, they are, in level bush country a good substitute for scouting; they afford a look out station, signal position, and place from which to work a search light.

Q. What two advantages does an observatory offer to signalling ?

A. A great extent of horizon, and a means of escaping ground vapours.

Q. Can any fixed rule be laid down, as to the height observatories may be raised in the field ?

A. No, it depends on the extent and nature of the country to be watched, and the means, material, and time, at disposal for construction.

Q. By whom is an observatory usually occupied, and how are messages for delivery and despatch, exchanged between signallers and orderlies, on one hastily constructed, and for what reason ?

A. A signal party, and look-out man with a powerful telescope, the messages are pulled up or let down, in order to prevent traffic, and consequent shaking of the observatory.

Q. Will a sending station continue to call another station even though the former has reason to believe that the latter is occupied with another station ?

A. Yes, unless it receives M Q from it.

MISCELLANEOUS.

Q. When communicating between ships and shore and transmitting signals inland, what is the quickest and best system of signalling to adopt, and why ?

A. The only means of communication between ships and shore being by boat or signal, and messages in many cases having to be transmitted, the work is very considerable; the shore party must therefore consist of signalmen landed from the ships, or if available, Marines to work the semaphore system (using flags), the messages being transmitted, if neces-

sary, by men skilled in the Army and Navy code. These combined stations answered admirably at Suakim.

Q. Why in the field, previous to an engagement, is it most desirable to inform the Director of Signalling of the probable positions which the General Officer Commanding and staff will take up during the action?

A. In order that the former may acquaint the Brigade signal officers from what quarter especially they are to look for signals.

Q. How is the regimental signalling equipment procured?

A. On requisition in duplicate Army (Form G 1041) from the Ordnance Store Department.

Q. Is regimental signalling equipment supplied to Brigade Depôts?

A. No.

Q. To what corps will the issue of regimental signalling equipment be confined?

A. Regiments of Infantry and Cavalry, Head Quarters of Royal Artillery Districts (for Garrison Artillery), and to the Head Quarter Stations of Commanding Royal Engineers, (for Companies of Royal Engineers).

Q. When making requisitions for materials for signalling lamps, what will Commanding Officers state thereon?

A. The number of classes for which the supplies are demanded.

Q. On the establishment of a fixed station, who will the officer or N.C.O. in charge inform of the fact, and what steps will be taken to provide for the conveyance of messages?

A. The Commandant or Staff Officer, at the same time applying for any mounted or dismounted orderlies he may require.

Q. Is it desirable on the establishment of a fixed station to ascertain the whereabouts of the probable recipients of messages (General Officers, Commanding Officers, Staff Officers, and Heads of Department)?

A. Yes, certainly, and without loss of time.

Q. If the whereabouts of the "addressee" of a message cannot be ascertained, and how and where will advice be given by signal?

A. By S G, to the office of origin.

Q. Should signallers in any case in the field leave their stations to deliver messages?

A. On no account whatever.

Q. Why in the field, if possible, should early information be notified to the Director of Signalling concerning every contemplated movement of the troops?

A. In order that he may pre-arrange and settle upon the ground for such new stations as the anticipated movement may render necessary.

Q. What steps may a station take with a view to a more favourable background being adopted by another station, and how may the former halt the latter when in a favourable position?

A. It will hold up its flag upright or keep its light exposed whilst the change of position is taking place, lowering the flag or obscuring its lights immediately the moving station has reached a spot with a good back ground.

Q. How may a station in the act of changing its position to secure a better background, best mark the direction of its movement?

A. By keeping its flags exposed whilst taking up its new position.

Q. Why are a large number of signal parties undesirable with the fighting line?

A. Because they tend to cause confusion.

Q. Who of the signalling party at a station is responsible for the care of the instruments?

A. The non-commissioned officer in charge.

Q. When two or more signalling parties are with their

brigades at the same position, on whom does the duty of signalling devolve?

A. That party attached to the senior officer in command of the whole.

Q. To whom should an application for an escort for signallers be made?

A. To the officer commanding on the spot who will grant it at his discretion.

Q. When might it be desirable for signalmen to be accompanied by an escort?

A. When it is impossible from the nature of the ground to see other stations, and more favourable ground is not far distant.

Q. On whose charge is the signalling equipment in possession of regiments in the field?

A. On the charge of each regiment.

Q. In the field, what arrangement is made for the issue of signalling stores to regiments, in excess of their ordinary regimental equipment?

A. A depôt is usually formed at the base of operations in charge of a non-commissioned officer (as storekeeper) acquainted with signalling stores, appointed by, and in charge of, the Director of Signalling. Brigade signal officers requisition direct to storekeeper, reporting to the director of signalling that they have done so, and issue to regimental signallers, obtaining in each case receipts from them for the several articles furnished on demand.

Q. How are field glasses best held, and why?

A. With both hands held tube-wise grasping the eye-piece, so as to shut out all external light from entering between the eye, and eye-piece of the glass.

Q. What are the relative advantages of the service telescope and binocular for signalling use?

A. The former possess a much greater power for reading distant signals, but takes some time to get into position, and requires perfect steadiness and previous instruction, the latter do not require a rest, shew a larger field for general observation, and can be used by mounted and dismounted men for reading signals at short distances.

Q. How may men be advantageously selected for a class of instruction in signalling?

A. By their hand writing taken from the regimental copy books. Men who when making block capitals fail to cross the A, or make the L back to the front, are generally unsuitable as signallers.

Q. How may a ratio be established between the speed of sending and the accuracy of reading a message?

A. A decrease of five seconds in the time taken to send a message is equivalent to one mistake to each man's reading.

Q. Why should the officer or non-commissioned officer in charge of a signalling station, on an important message being handed in, which it appears, owing to atmospheric, or other causes, cannot be despatched for some time, furnish the originator of the message with information of the fact?

A. In order that the latter may, if necessary, take other means of forwarding it. Nursing messages, unbeknown to the originators, is most undesirable, as tending in certain cases to delay operations, the carrying out of which may be the indirect cause of the failure of some important movement.

Q. How long will the gas in the two bags of the lime light apparatus last when they are full?

A. With care, about two hours.

Q. In checking test messages, are men to be given credit for what might be mistakes in calling out?

A. In no case.

Q. In what case only during an inspection may the sender read for himself the groups he has to send?

A. When as an assistant instructor he is sending with the small flag or lamp.

Q. What credit will be given for letters that are read correctly, but have been sent instead of true group letters, and how will the circumstance be noted?

A. Credit will be given for error of this description in every test message. On completion of the group, the caller out, or assistant instructor (if the test has been sent by the latter) will at once inform the inspector that they have been sent for true test, and the latter will make the necessary records and award the necessary credit, provided it is clear that there has been no intentional substitution of the more quickly formed letters.

Q. Will it be necessary to mark the groups when sending test messages with the flag and lamp at the annual inspection, and how should the groups be written down?

A. The groups of the best messages sent with the flag will be properly marked by the sender, and written down accordingly; those sent with the lamp will not be marked and will be written down in groups of four letters, under one another.

Q. Is it allowable to mark the letter "H" with five dots, or to improperly mark, or neglect to mark the groups of a test message?

A. No.

Q. What record should be made by a transmitting station of the test messages, composed of groups, etc., sent through it at the annual inspection?

A. They should be written down in the ordinary manner.

Q. Why is it an advantage for the reader at a transmitting station to close his ears while a message is being passed through the station?

A. Because by so doing he will be able to concentrate his attention on the flag he is reading, and thus prevent himself hearing the noise made by the one used for transmission.

Q. In checking test groups, what phonetic errors are usually allowable?

A. **P** for **T**, **V** for **B**, **F** for **S** and *vice versa.*

Q. How may imperfect marking of groups be penalized?

A. By requiring the senders to send again but taking the accuracy from the first reading.

Q. Is the figure of merit of a battalion, supposing eight men are tested, reckoned from the performances of the six best men, or from the six best performances in each practice?

A. From the six best performances in each practice irrespective of how the men have done in the other two practices.

Q. Are the flags, poles, and lamps used at an inspection to be strictly in accordance with regulation as regards their weight, size, and construction.

A. Yes, poles made of cane, flags made less than regulation size, or lamps which by the insertion of tin in their sockets, and can thus be heard as well as seen, are on no account to be used.

Q. At what distance should the lamp be read?

A. About 400 yards, in any case out of earshot, which should be as much as possible sheltered from the wind.

Q. How may a fog-horn or bugle be usefully employed?

A. As a means of calling a station within earshot, separated by a ravine, water, etc.; thus saving a look-out being kept towards that particular station.

Q. What disadvantages other than those mentioned in the Manual on Army Signalling are there in the employment of the electric telegraph, give examples?

A. The matériel is considerable, the wires are easily broken; if laid along the ground, by transit of carriages, horses, etc.; if on poles, by being blown down, cut by projectiles, etc. It can be tapped or false information or orders sent along it, as often happened during the American war; its use can be

temporarily destroyed by means of non-conducting wire, or being cut, and it then takes time and experts to repair it. During the siege of Paris the Germans were three days without communication with Versailles. It cannot be used from a position surrounded by the enemy; during a retreat it is useless.

Q. State briefly some of the disadvantages connected with the employment of signalling.

A. (*a*) It is to a great extent dependant on the state of the atmosphere and the formation of the country; (*b*) it can be read by the enemy; (*c*) a constant watch has to be kept on the stations; (*d*) there is no tape record.

Q. Besides the state of the atmosphere, on what does the range at which signals can be read, depend?

A. On the power of the sending and receiving instruments.

Q. What atmospheric conditions seriously affect signalling?

A. Shifting clouds, fogs, mists, and sandstorms.

Q. What are the disadvantages of the employment of the electric light as a means of signalling?

A. (*a*) It can only be used at fixed stations, or with ships, where the means of supplying it are available; (*b*) it has little power to penetrate fog, on account of the preponderance of blue and violet rays in its light.

Q. Why is the limelight suitable for penetrating fogs?

A. Because of its yellow light which vapour does not easily absorb.

Q. How should a signaller on taking up a position make sure that the formation of the ground in his vicinity makes him visible to the station with which he is desirous of communicating?

A. By looking along the ground level.

Q. Why is a camp an unsatisfactory position for a signal station, and how may the disadvantage be obviated?

A. Because of the smoke and dust rising from it, and the fires at night. The station should be established, if possible, a short distance on the outskirts of the camp and nearest the station to be corresponded with, and at night clear of all lights.

Q. Before a party goes out, is it desirable for them to take a bearing to the distant position agreed upon for a station, and if so, why ?

A. Yes, in order that on their arrival there by taking the opposite bearing to that already taken they can fix the position of the home station, which it is often difficult to do if the latter is at a good distance or situated on a range of hills.

Q. As a general rule, should messages be addressed by the official title or name of the person to whom the message is sent ?

A. The official title.

Q. In the field, how does the officer or non-commissioned officer in charge of a party, know that a message handed in for despatch by a press correspondent, officer, or other person, is authorized ?

A. By its bearing the signature of the press censor, or some other responsible authority.

Q. Do correspondents always remember that their messages and corrections must be signed, or initialled by the press censor or other authority.

A. No, they sometimes forget this detail.

Q. If an unsigned message is inadvertently despatched who is responsible for the error ?

A. The responsibility rests with the officer or non-commissioned officer in charge of the station ; signal officers and others in charge of stations should therefore know the name of the censor in order that persons may be referred to him without delay.

Q. In the field, what course is pursued before a private message can be despatched ?

A. It is franked by the Chief of the Staff, or his deputy,

a note being usually made on the message that it is to be despatched only when all service messages have been sent.

Q. Why is it important that a large number of officers be detailed for signalling service during a campaign ?

A. So that all the most important stations may be in charge of one ; any surplus can always be employed in exploring the country for suitable positions for new stations or improvement of those already established, or in supplying casualties.

Q. When first throwing out a line of stations if there are points which appear to be equally fitted for a forward station, are they all to be provisionally occupied ?

A. Yes, and those less adapted subsequently withdrawn.

Q. How is the position of an out station in the field ascertained ?

A. By means of a telescope, compass, map, and protractor.

Q. Is it sometimes desirable at night to mark a station by means of fixed lights directed towards other corresponding stations ?

A. Yes.

Q. What method does a receiving station adopt to get the best possible light from a sending station when the latter is using a lamp or heliograph and shewing a bad light ?

A. The receiving station interrupts the sending and makes a succession of dots more or less quickly as the light of the sending station diminishes or increases, shutting off its light when satisfied.

Q. How may the actual light given by the oil lamp be improved ?

A. By previously dissolving a little camphor in the oil used.

Q. From whom should the colza oil and wick for the lamps as a rule be drawn ?

A. The Army Service Corps.

Q. If a receiving station has to stop a sending station for a time, while the latter is forwarding a message, how does it proceed ?

A. By signalling the stop signal followed by M Q.

Q. Before proceeding to take up a distant station, is it desirable to inform the home station when there is a likelihood of being in position ?

A. It is most desirable to state as nearly as possible the approximate time, but this must not prevent the home station keeping always on the alert.

Q. On permanent stations how can the attention of a station be easily attracted, and what saving is thereby effected ?

A. By the station which is desirous of communicating hoisting a large flag on a signal staff, thus, at long distances, preventing the necessity of continually keeping a man at the telescope; it is also a quick way of calling the look-out man if he has many stations to watch.

Q. What two courses are open to a receiving station when, from the telescope becoming displaced, or other causes, it is compelled during a message to send the "stop" signal, and the sending station proceeds with the message misreading the "stop" signal for "answer" ?

A. Either to ask for repetitions in the usual way, on the completion of the message, or, having secured the attention of the sending station, to at once take up the thread of the message by sending the last word received correctly, preceded by the "A A," the former is the method usually adopted.

Q. Why on a general movement of troops should the signal stations be kept working as long as possible ?

A. Because at the last moment there are generally important messages to send and receive.

Q. Define moving and fixed stations; where if possible should the former be located?

A. A moving station is one which cannot pre-arrange its position with another, it should be located near some well defined object such as a windmill, isolated house, etc., so as easily to attract attention. A fixed station is one which has already taken up its position, or has had its exact position defined *in prospective.*

Q. What are some of the methods employed for marking a station or attracting attention?

A. Making fires of damp leaves or straw, firing trains of gunpowder and rockets, etc., distinguishing the station by a fixed light, firing guns, or displaying flags.

Q. What is a convenient means of transport for the lime-light apparatus in the field?

A. A mule, with a basket containing the apparatus slung on either side.

Q. What do the two numbers signify, which in the field generally precede the text of a message when handed into a sending station, and why is it desirable to send them, give an example?

A. The former number is the date and is used in case of reference, the latter represents the sum total of messages despatched by the sender during the campaign, of all of which he possesses a copy, it is used in case of reference, should the addressee require to quote the message, viz., 15, one, six, three, does your one, nine, eight preclude my sending out patrols to cover working parties.

Q. On what is the lime-light lamp fixed?

A. It is made either to screw on the stand supplied with it, or the tripod of the heliograph.

Q. Of what does light consist?

A. Waves which traverse a medium pervading space.

Q. What are the two laws of reflection of light?

A. Whatever the angle which the sun, impinging on a mirror, forms with a perpendicular to that mirror, the angle at which it is turned away from that perpendicular will be the same, *i.e.*, the angle of reflection is equal to the angle of incidence.

2nd. The plane in which the incident light from the sun is found, will be the same as the plane in which the reflected light is found, *i.e.*, the plane of incidence coincides with the plane of reflection.

Q. How do signallers of Infantry Battalions when at Field Days, carry their rifles ?

A. Slung across their backs, in order that they may be able to use them when required. They will also wear the expense pouch. $\frac{\text{A.O. 122}}{1887.}$

Q. How are rifles and flags respectively carried by Signallers in marching past ?

A. They will sling the former, and carry the latter $\frac{\text{A.O. 122}}{1887.}$

Q. Give the approximate weight of a set of Signalling Stores, including Tent and Mule Equipment as carried with the Head Quarters Store of an Army in the Field ?

A.

Signalling Stores 1 set	lbs.
In Pannier Signalling	100
Tent	75
Mule Equipment	74
	249

(Manual of Field Service—Infantry, 1888.)

Q. What scale of picketing gear &c., has been approved for issue to Signallers for both peace and war ?

A. 1 length of built up rope, 1 heel rope, 1 head rope, 2 picketing pegs for horse, 1 mallet to every 3 horses for officers, 1 mallet to every 8 horses for other cases. $\frac{\text{A.O. 97}}{1889.}$

Q. How are the articles to be carried ?

A. On the horse. A.O. 97 1889.

Q. Under what condition will this picketing gear be issued?

A. Only when required for actual use. A.O. 97 1889

Q. By who and of whom is this picketing gear to be demanded?

A. Requisitions should be put forward by Commanding Officers upon the Ordnance Store Department for any of the equipment for peace not in possession when required for actual use. A.O. 97 1889.

Q. With reference to A.O. 229, June 1888, under what group for the convenience of administration are the duties devolving on the staff officer in regard to Signalling classified?

A. Under letter A.

Q. In the field, will a station remain in position, even though the state of the weather would appear to preclude the possibility of further communication?

A. Yes, even remaining beyond its appointed working hour, if there is a chance of its clearing.

Q. What does Lieutenant-General Chapman in his paper, read at the R.U.S.I., on the march from Kabul to Kandahar, say of signalling?

"It may here be noticed that the great perfection to which the practice of army signalling has been brought made the heliograph a very important aid in communicating intelligence · · · · · the trained signallers of the force were constantly employed, and by the judicious use of the heliograph on many occasions, the troops, cavalry and infantry, were

spared fatigue, the several brigades being constantly in communication by signal . . . . . the value of this agency can only be fully appreciated when it is applied in the field, particularly during operations in mountainous countries to convey rapidly information of importance . . . . . but the benefits conferred on the Kabul field by the staff of army signallers under their gallant leader cannot be forgotten."

Detail of Articles of Signalling Equipment Authorized for the undermentioned Services as a Peace Proportion.

DESCRIPTION OF STORES.	Battalion of Infantry.	Regiment of Cavalry.	Battery of Artillery.	Brigade of Infantry.	Brigade of Cavalry.	REMARKS.
Belts, Waist — Waist	2	—	2	6	—	No Binocular glasses authorized in peace. Batteries of Artillery get the same as a Regiment of Infantry, except in flags and poles, only half of which are allowed in peace. (As entered). Message Books are drawn, but not accounted for.
Belts, Waist — Pouch, buff, R.A., R. & F. for telescopes	—	4	—	—	12	
Books — Manual of Instruction	4	4	4	12	12	
Books — Message, each with 2 sheets of carbon paper	4	4	4	12	12	
Books — Signal Army and Navy	4	4	4	12	12	
Bottles, tin, oil screw top, 2 quarts	1	1	1	3	3	
Cans, tin oil feeding, ½-pint	2	2	2	6	6	
Cases, leather waist belt, for — books message	2	2	2	6	6	
Cases, leather waist belt, for — feeding cans	2	2	2	6	6	
Chests, wood, with hasps	1	1	1	3	3	
Flags, visual, signalling, muslin, 3 ft.x3 ft. — dark blue	4	8	2	12	24	
Flags, visual, signalling, muslin, 3 ft.x3 ft. — white with stripe	4	8	2	12	24	
Flags, visual, signalling, muslin, 2 ft.x2 ft. — dark blue	4	8	2	12	24	
Flags, visual, signalling, muslin, 2 ft.x2 ft. — white with stripe	4	8	2	12	24	
Poles, Flag Visual, 5 ft. 6 ins.	10	20	5	30	60	
Signalling 3 ft. 6 ins.	10	20	5	30	60	
Horns, Fog	2	2	2	6	6	
Lamps, Signalling Bullseye	4	4	4	12	12	
Locks, Pad, small, with keys	1	1	1	3	3	
Scissors, Lamp, with guard, pairs	2	2	2	6	6	
Stands, Telescope, tripod, in 2 parts	2	2	2	6	6	
Telescopes, Hand Draw, Army Signalling, with cap, for Belt	—	4	—	—	12	
Telescopes, Army Signalling, with Strap	2	—	2	6	—	
Wheels, Cipher	2	2	2	6	6	
Cotton Waste, lbs.	3	3	3	9	9	
Oil, Colza, pints	30	30	30	90	90	
Wick, Cotton, 1½" yards	10	10	10	30	30	

(*Appendix II.*)

Detail of Articles of Signalling Equipment furnished to the undermentioned Service as a War Proportion.

DESCRIPTION OF STORES.	Battalion of Infantry.	Regiment of Cavalry	Battalion of Artillery.	Brigade of Infantry	Brigade of Cavalry.	REMARKS.
Belts, leather, pouch, buff, R.A. rank and file (for telescopes)	—	2	—	—	6	Cavalry only.
Bottles, tin Oil, screw top, 2 quarts	1	1	1	3	3	
Books — Manual of Instruction	4	4	4	12	12	
Books — Message Book 119 A.	2	4	2	6	12	Each with two sheets of Carbon paper.
Cans, tin, Oil Feeding, ½ pints	2	2	2	6	6	
Cases, leather — for book message	2	2	2	6	6	
Waist-belt — for feeding cans	2	2	2	6	6	
Chests, wood, with hasp	1	1	1	3	3	
Flags, Visual, 3 ft. × 3 ft. — dark blue	2	4	2	6	12	
Flags, Visual, 3 ft. × 3 ft. — white with stripe	2	4	2	6	12	
Signalling, Muslin, 2 ft. × 2 ft. — dark blue	2	4	2	6	12	
Signalling, Muslin, 2 ft. × 2 ft. — white with stripe	2	4	2	6	12	
Horns, Fog	2	2	2	6	6	
Lamps, Signalling bull's-eye	4	4	4	12	12	
Locks, Pad, small, with key	1	1	1	3	3	For Chests.
Poles, Flag, Visual 5 ft. 6 ins.	5	10	5	15	30	
,, ,, Signalling 3 ft. 6 ins.	5	10	5	15	30	
Scissors, Lamp, with guard	2	2	2	6	6	
Cotton waste, lbs.	3	3	3	9	9	
Oil, Colza, pints	30	30	30	90	90	For Lamps.
Wick, Cotton, 1½ ,, yards	20	20	20	60	60	
INSTRUMENTS, &c.						
Cases, leather, Binocular Glass	2	2	2	6	6	
Glasses, Field, Binocular	2	2	2	6	6	
Stands, Telescope, tripod	2	2	2	6	6	
Telescopes, Army Signalling, with case and straps	2	—	2	6	—	Infantry.
Telescopes, Army Signalling, with caps, &c., for belt	—	—	—	—	6	Cavalry.
Wheels, Cipher	2	2	2	6	6	

(*Appendix III.*)

PRICES OF ARTICLES OF SIGNALLING EQUIPMENT, &c., AS SANCTIONED.

Vocabulary of Stores, &c., as used in Her Majesty's Service 1886—9.

	£	s.	d.
Belts, Waist { Waist	0	3	3
Belts, Waist { Pouch, buff, R.A., R. & F. for telescope	0	2	2
Books { Manual of Instruction	0	0	3
Books { Message, each with 2 sheets carbon paper	0	1	0
Books { Signal, Army and Navy	Gratis		
Bottles, tin oil, screw top, 2 quarts	0	0	7
Buckets, leather, with cap and sling for stand—Mounted corps	0	11	9
Bags { Gas, mackintosh	0	19	8
Bags { Pressure, canvas	0	3	1
Bottles, Cleansing Gas, copper, brass mouthpiece	0	5	6
Badges, Flags, Crossed { Gold, for N.C.O. Instructors	0	1	1
Badges, Flags, Crossed { ,, Household Cavalry	0	1	2
Badges, Flags, Crossed { Worsted, on blue, for Infantry ... per doz.	0	3	9
Badges, Flags, Crossed { Ditto, on red ... ,,	0	3	5
* { Yeomanry	–	–	–
* { Volunteers	–	–	–
Cotton Waste, per cwt.	1	0	3
Cans, tin oil, feeding, ½ pint	0	0	3½
Cases Leather Waist-belt for { Books, Message	0	4	9
Cases Leather Waist-belt for { Feeding Cans	0	0	8
Cases, Leather, Binocular Glasses { Cavalry	0	4	3
Cases, Leather, Binocular Glasses { Infantry	0	3	6
Chests, Wood with hasp	2	6	3
Cotton { Blue / White } Repair of signalling flags, reel	0	0	1
Cases { Brass, 1 gall. spirits of wine	0	5	10
Cases { Iron, 2 galls. of oil or spirit, with brass tap and key	1	6	1
Cases { Tin, 38 lbs. of oxygen mixture	0	10	3
Flags, Visual { 3 ft. x 3 ft. { Dark Blue	0	1	2
Flags, Visual { 3 ft. x 3 ft. { White with Stripe	0	1	2
Signalling Muslin { 2 ft. x 2 ft. { Dark Blue	0	0	10½
Signalling Muslin { 2 ft. x 2 ft. { White, with Stripe	0	0	11
Flasks, brass, with cap forming ½ lb. measure for 4 lbs. oxygen mixture	0	13	10
Glass, Field Binocular	1	1	9
Heliograph complete, 5 in.	11	5	0
Horns, Fog	0	1	5
Lamps, Signalling bull's-eye	0	4	8
Locks, Pad, small with key	0	0	6½
Lamps, Lime Light, complete with flashing disc	5	10	2
Oil, Colza, per gallon	0	2	6
Poles { 5 ft. 6 in.	0	1	1
Visual Signalling { 3 ft. 6 in.	0	0	10
Pencils, 12 in sand in glass bottle	0	1	9
Pannier's Signalling with lid and tarred canvas cover	0	17	1
Retorts { Copper / Iron } with brass mouthpiece each {	0	7	2
Retorts { Copper / Iron } with brass mouthpiece each {	0	4	5
Scissors, Lamp, with guard, pairs	0	0	11
Stands, Telescope, tripod in two parts	2	10	0
,, Heliograph or lamp (mounted or dismounted)	2	11	2
Telescope, Army Signalling, with case and strap (Infantry)	1	0	6
,, ,, ,, with caps, &c., for belt (Cavalry)	0	19	6
Wheels, Cipher	0	2	9
Wick Cotton 1½', per lb.	0	1	9

* *Same as for Regulars—unless obtained from Private Trade.*

(*Appendix IV.*)

TABLE of those Regiments which have stood respectively 1st and 2nd in the Annual Return showing the efficiency of Regiments in Army Signalling inspected in the United Kingdom since the year 1877.

Year.	Order.	Regiment.	Signallers.	Supernumeraries.	Large Flag words a minute. Maximum.	Minimum.	Average.	Through one intermediate Station.	Percentage of letters read correctly.	Small Flag. Words a minute.	Percentage of letters read correctly.	Lamp. Words a minute.	Percentage of letters read correctly.	Figure of Merit.
1878	1	C. Troop, R.E. ...	9	0	12.81	9.85	11.36	10.00	98.8	...	...	...	...	120.16
	2	86th Regiment ...	6	2	10.86	9.30	10.00	8.70	96.8	...	...	...	...	115.50
1879	1	41st Regiment ...	6	9	10.46	9.61	10.12	9.09	100.00	...	...	...	...	119.21
	2	86th Regiment ...	6	0	10.16	10.46	10.46	10.46	97.30	...	...	...	...	118.22
1880	1	C. Troop, R.E. ...	12	0	11.23	8.89	10.52	10.25	97.11	...	...	...	...	117.88
	2	86th Regiment ...	6	3	12.90	11.11	11.56	10.92	95.32	...	...	...	...	117.80
1881	1	2nd Batt. S. Lancashire Regt. ...	6	6	10.00	9.48	9.75	9.61	99.78	...	...	...	...	119.15
	2	2nd Batt. R. Irish Regiment ...	6	5	10.00	9.26	9.70	10.00	99.35	...	...	...	...	119.05
1882	1	2nd Batt. S. Lancashire Regt. ...	6	8	10.00	10.00	10.00	10.00	100.00	12.42	99-57	...	...	231.99
	2	3rd. Batt. Grenadier Guards ...	6	8	10.00	10.00	10.00	10.00	100.00	12.42	99.79	...	...	231.56
1883	1	2nd Batt. S. Lancashire Regt, ...	6	8	10.00	10.00	10.00	10.00	100.00	13.79	99.79	...	...	233.58
	2	R. Scots Guards	12	20	10.00	10.00	10.00	10.00	100.00	13.33	100.00	...	...	233.33
1884	1	1st Batt. Manchester Regt. ...	6	6	10.00	10.00	10.00	10.00	100.00	16.43	99.35	10.34	98.51	344.63
	2	1st Batt. Coldstream Guards	6	8	10.00	10.00	10.00	10.00	100.00	15.38	98.29	10.52	97.23	341.42
1885	1	1st Batt. Manchester Regt. ...	6	6	10.00	10.00	10.00	10.00	100.00	17.64	96.79	11.21	98.93	344.57
	2	1st Batt. Grenadier Guards ...	6	8	10.00	10.00	10.00	10.00	99.57	17.14	98.93	10.81	97.43	343.88
1886	1	2nd Batt. Grenadier Guards ...	6	8	10.00	10.00	10.00	10.00	100.00	20.00	100.00	13.18	97.43	350.61
	2	1st Batt. Grenadier Guards ...	6	8	10.00	10.00	10.00	10.00	99.79	18.46	98.51	13.04	97.65	347.45
1887	1	1st Batt. Middlesex Regiment ...	6	8	10.00	10.00	10.00	10.00	100.00	16.00	100.00	16.66	98.71	351.37
	2	1st Batt. Leicester	6	6	10.00	10.00	10.00	10.00	100.00	15.78	100.00	16.21	98.93	350.92
1888	1	1st Grndr. Guards	6	8	10.00	10.00	10.00	10.00	100.00	16.00	100.00	16.00	99.35	351.35
	2	2nd Grndr. Guards	6	8	10.00	10.00	10.00	10.00	100.00	16.00	100.00	16.00	99.35	351.35

(*Appendix V.*)

From

The Brigade Signalling Officer.

Infantry Brigade,

To

The Brigade Major,

Infantry Brigade.

.....*18*.....

Sir,

I have the honour to report for the information of the General Officer Commanding, that Brigade signalling practice has taken place under my superintendence regularly.....days in each week of the past month of.....both by day and night.

The whole of the Regiments quartered in the command took part in the practices on each occasion, except the .....Regiment who were.....

The practices were satisfactory (or otherwise).

I have the honour to be

sir,

Your obedient servant,

.....

Brigade Signalling Officer.

SIGNAL STATIONS.

Return of Messages for the Week ending Saturday 18 18

Station.	No. of Men.	Corps.	Sent.	Trans-mitted.	Delivered.	Total.	Remarks.
TOTAL							

Infantry Brigade Signalling Officer.

EXAMPLE OF TEST MESSAGE (EQUIVALENT TO 20 WORDS OF FIVE LETTERS.)

I F X
A G M S
Y L M T A
F P
X K U
B H N T Z G N D
U B G L
Q V
C A U H O T
I L O
M R W O S
N J
W P I B V D H
P J E K
V C
Q W F
C J Q
X E Y R D
Z X
K R Y E S

N.B.—All *Test* Messages will be written in Block Capitals, and group under group, On the lamps, Test Messages will be sent without any pause, but will be written down in groups of four letters.

ARMY SIGNALLING.

No. of Regiments and Batteries inspected in United Kingdom_____. Classified.

Return showing efficiency of Signallers in each Regiment, Battalion, or Battery Garrison Artillery inspected in the_____District in the year 188 .

Order.	Regiments.	Signallers.	Supernumeraries.	Large Flag.					Small Flag		Lamp.		Figure of Merit.	Heliograph if trained in.	Lime-light if trained in.	Remarks.
				Maximum sending.	Minimum sending.	Average rate of sending.	Through transmitting station.	Percentage of letters read correctly.	Rate of sending.	Percentage of letters read correctly.	Rate of sending.	Percentage of letters read correctly.				

Inspector of Signalling.

(*Appendix IX.*)

40185
4487

ABBREVIATIONS SANCTIONED BY MANUAL FOR SIGNALLERS, 1888

Indicator – —— – ——

To be sent at the commencement and conclusion of signallers directions to each other. It should be answered by the indicator – —— – ——

All right	**RT**
Go on	**G**
Move to your right	**R**
,, ,, left	**L**
,, higher up or further off	**H**
,, lower down or closer	**O**
Stay where you are	**SR**
Separate your flags	**S**
Use blue flag	**B**
,, white flag	**W**
,, large flag	**LF**
,, small flag	**S**
Your light is bad	**LB**
Turn off extra light	**TOL**
Wait	**MQ**
Say when you are ready	**KQ**
I shall signal without expecting answers (p. 56)	**KK KK**

The indicator should only be used with the above directions, or after a message has been commenced, to show that what follows has nothing to do with the message itself.

(*Appendix X.*)

ABBREVIATIONS SANCTIONED BY MANUAL 1888.

Adjutant	Adj	Head quarters	Hq
Adjutant general	Ag	Heliograph	Helio
A.M., or morning	Am	Infantry	Inf
Army medical staff	Ams	Lieutenant	Lt
Artillery	Arty	Major	Maj
Asst. adjt. general	Aag	Medical staff officer	Msc
Asst. commissary gen.	Acg	Memorandum	Memo
Asst. qr. master gen.	Aqmg	Message	Ms
Battalion	Bn	Non-com officer	Nco
Battery	Bat	North	N
Brigadier	Bdr	North-east	Ne
Brigade	Bde	North-west	Nw
Captain	Capt	Officer	Off
Cavalry	Cav	Officer commanding	Oc
Colonel	Col	Ordnance department	Ord
Commanding Officer	Co	P.M., or afternoon	Pm
Com. royal engineer	Cre	Post Office	Po
Com. royal artillery	Cra	Principal med. officer	Pmo
Commissary general	Cg	Private	Pte
Commissariat and Transport	Ctc	Quartermaster	Qm
Chief of staff	Cos	Quartermaster gen.	Qmg
Company	Coy	Regiment	Rgt
Corporal	Corp	Right	Rt
Department	Dept	Royal artillery	Ra
Dep. adjt. general	Dag	Royal engineers	Re
Dep. qr. master gen.	Dqmg	Royal horse artillery	Rha
Dep. asst. qr. mr. gen.	Daqmg	Sergeant	Sgt
Dep. asst. adjt. gen.	Daag	Senior Commissariat Officer	Sco
Division	Div	Senior ordnance store officer	Soso
Doctor	Dr	South	S
East	E	South-east or west	Se or Sw
Field Officer	Fo	Telegraph	Tel
General	Gen	West	W
Gen. off. commanding	Goc.		

MONTHLY RETURN of Practice and instruction carried on by the_____Regiment during the month of____188

RANK AND NAME.	Words a Minute. Rate of sending Large Flag.	Words a Minute. Rate of reading Small Flag.	Percentage of Letters read correctly.	Rate of reading Minute. Lamp.	Percentage of letters read correctly.	Heliograph if trained in.	Limelight if trained in.	Brigade practice will be shown by the letter B inserted in date column. Regimental practice by the letter R. Instruction by the letter I. Practice by night will be shown by the letter N underneath the B or R. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	REMARKS.

This Return to be filled in daily.

The trained Signallers to be tested for rate of reading and sending at the end of each month.

The returns for the 3 months to be rendered quarterly through the Officer Commanding the District.

Trained Signallers to be shown first, Supernumeraries second, Men under Instruction third.

N.B.—The names of Officers and Men who have become non-effective during the quarter should be inserted below the list of men under instruction; date and cause of becoming non-effective to be shown.

_____ Regimental Instructor.

_____ Commanding _____

(*Appendix XII*)

WAR ESTABLISHMENT, ARMY SIGNALLERS.

ESTABLISHMENT of one Mounted and one Dismounted Company of Army Signallers, each capable of being divided into Sections of seven men, and half Sections of three or four men.

TABLE 1.

	Personnel of each Company.				Horses.				
					Mounted Company.			Dismounted Company.	
	Officers	Staff-Serjeants and Serjeants.	Rank and File.	Total	Private or provided under Allowance Regulations.	Public. Riding	Public. Draught.	Private, or provided under Allowance Regulations.	Draught.
Captain or Lieut.	1	...	...	1	3	...	...	1	...
Company Sergeant Major.	...	1	...	1	...				
Sergeant	...	1	...	1	...	30	8*	...	8*
Rank and File ...	...	...	28	28	...				
Bâtman	...	...	1	1	...	...	...	...	...
*Drivers**	...	...	4	4	...	...	...	...	...
Total ...	1	2	29	32	3	30	..	1	...
	...	...	*4*	*4*	...	...	*8*	...	*8*

When pack transport is substituted for wheeled transport, 22 pack animals will be required for a mounted company, and 18 for a dismounted company.

* Provided by Army Service Corps.

(*Appendix XIII.*)

Stores carried by Regimental Transport for one Mounted and one Dismounted Company of Army Signallers.

When wheeled transport is used, each cart is equipped with the stores detailed in Table 1.

When pack transport is used, each mule is equipped as shown in Table 2.

Table 1.—Cart Stores.

Articles.	No.	Total weight	How packed.
		lb.	
Ordnance Stores.			
Blankets, G.S., for drivers ...	1	4¾	In body of cart.
Boards, inventory, with list...	1	1	In locker.
Boxes, grease, 3 lb.	1	1¼	On near side.
Buckets, water, G.S., leather	1	4¾	Slung under cart.
Cordage, tarred, spun yarn, hemp, 3-thread ... skeins	1	5	In locker.
Grease, Field's ... ... lb.	...	3	In box.
Hooks, reaping, large	1	1	Strapped on tail-board.
Lashing, white, 1-inch, 30-ft.	2	3	In locker.
Pins, linch, 3rd class (or 2nd class, steel, if for cart, ammunition, S.A.)	1	¼	,,
Ropes, drag, light... pairs	1	7	Strapped on foot-board
Washers, drag, 3rd class, B..	1	¾	In locker.
Army Service Supplies and Miscellaneous.			
Forage, reserve for draught animals	...	40	In body of cart.
Total cart stores ...	..	71¾	
Cart, forage, with raves, bale-hoops, cover, and strapping	...	896	
Cart equipped	...	968	=8¾ cwt.

(*Appendix XIV.*)

TECHNICAL STORES CARRIED BY ARMY SIGNALLERS.

Articles of Signalling Equipment carried by the Signallers of a Half Section detached. Similar articles in like proportions will be carried when a Section is detached.

Articles.	No.	Weight. lb.	Weight. oz.	Remarks.
Flags, 3 ft. by 3 ft., dark blue	2	0	5½	
,, ,, ,, white, blue stripe ...	2	0	5½	
,, 2 ft. by 2 ft., dark blue	2	0	3	
,, ,, ,, white, blue stripe ...	2	0	3	
Heliograph, in leather case, complete, without stand	1	6	3	
Stand, Heliograph...	1	4	1	
Poles, flags, visual signalling ... 5 ft. 6 in.	3	1	14	
3 ft. 6 in.	3	0	13½	
Stands, telescope, tripod in 2 parts ...	1	0	12	
Telescope, hand drawing, A, signalling, with case...	1	2	6	
Watch, German silver case, strap and key	1	0	5	
Wheel, cipher, signalling	1	0	3	
Book, signalling army, 119 A	1	0	12	
,, ,, ,, large size ...	1	1	1½	
Knife, pen, clasp	1	0	0½	
Pencils, blacklead, H ... ... doz.	1	0	2	
Glasses, field, binocular, in leather case and strap	1	2	6	

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Cornhill	2/-	4/-	*Regimental Paper	2/-	5/-
Family Herald	2/-	6/-	Saturday Review	2/9	6/6
Field	3/-	7/-	Sporting & Dramatic	3/-	7/-
Fun	2/-	5/-	Temple Bar	2/-	4/-
Good Words	2/-	5/-	Tit Bits	2/-	6/-
Graphic	3/-	7/-	Truth	2/9	6/6
Harper	2/-	5/-	United Service	2/9	6/6
Home News	2/9	6/6	Vanity Fair	2/9	6/6
Household Words	2/-	5/-	World	2/9	7/-

To all Leather Cases the Crest of Regiment is added free of charge.

* When ordering please send a copy for size.

BOOKS AND FORMS

FOR

CANTEENS & COFFEE SHOPS.

ACCOUNT BOOKS. In accordance with the Army Order, Nov., 1889—

	Price.
Form A. General Monthly Stock and Cash Ledger. Grocery Bar,	25/-
Liquor Bar,	12/-
,, A. do. do. in Sheets for 1 Year	6/-
,, B. Cash Book of Daily Takings	10/-
,, B. do. do. in Sheets for 1 Year	2/-
,, C. Daily Stock Book. Grocery Bar, 25/-; Liquor Bar ...	12/-
,, C. do. do. in Sheets for 1 Year	6/-
,, D. Tradesmen's General Ledger	15/-
,, D. do. do. in Sheets ... 50 3/6, 100	6/-
,, E. Invoice Order Book	3/6
,, F. Monthly Abstract of Receipts & Expenditure, in Books of 50	12/.
,, F. do. do. in Sheets, 50 7/6, 100	12/-
Troops or Companies' Monthly Messing Account Book	15/-

The above Books are made of the best Account Book Paper, strongly Bound in leather, lettered in gold, and with printed list of Articles to last for years.

Daily Messing Books, Official Pattern ... ... per doz.	3/-
,, ,, ,, Covers for same ... ... each	1/3
Price List of Articles sold in Canteen. Size 22½-in. by 17½-in., 25 2/6, 50 3/6, 100	6/-
List of Articles giving percentage Form, Army Form F. 707, 25 2/-, 50 3/-, 100	4/.

Canteen Debit Forms, Statement of Company Accounts, Memorandum Forms, &c., printed to order.

Regimental Stationery Packets.

Note Paper and Envelopes stamped with Regimental Crest in any colour. No charge for dies. Every Regimental die is kept in stock.

No. 1, containing 3 Sheets of Good Note Paper and 3 Good Square Envelopes, stamped in relief. Envelopes printed for franking when required.

No. 2, containing 4 Sheets of Good Note Paper and 4 Good Square Envelopes stamped in relief. Envelopes printed for franking when required.

No. 3, containing 4 Sheets of Good Note Paper and 4 Good Square Envelopes, plain.

Stamping Guaranteed to be Perfect and done by Hand.

We have now the honour of supplying over 300 Canteens throughout the Service in all parts of the World.

☞ *Presidents of Canteens, Coffee Shops, Recreation Rooms, &c., are requested to send for the Special Canteen Price List, which includes the Official Rules for the guidance of Canteens and Coffee Shops, vide Army Order Nov., 1889.* ☜

LIST OF DEPARTMENTS.

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Engraving.

Having executed orders for a variety of Visiting, Complimentary and Ball Programme Cards, &c., we are prepared to submit numerous samples.

Bookbinding.

We have increased our facilities for Bookbinding, and are prepared to undertake any orders for that department, and can guarantee execution with as much dispatch as is consistent with good workmanship.

Gold Blocking.

Regimental Crests, Badges, and Colours stamped in gold upon any article made of leather or cloth. Brass Stamps designed and engraved for blocking.

Lithographic Printing.

We can submit various samples of our Lithographic Work, such as Plans of Kit, Regimental Flags, Badges, Music, &c.

Publishing.

We are prepared to make arrangements with authors of approved Military Books for printing and publishing of such works on the most liberal terms. Authors are invited to forward a specimen copy of their work.

All Goods sent Carriage Paid to any part of the World.

Letter-press Printing.

Estimates will be forwarded for Standing Orders, Regimental, and any description of Miscellaneous Printing; the utmost expedience used in production of the work.

Music Printing.

We undertake to publish Regimental Marches, Bugle Calls, &c., with the Crest, Motto, &c. of the Regiment on Cover. Samples upon application.

Stationery.

Being large buyers of Stationery, we can supply Canteens and Messes, at wholesale prices, in quantities.

Relief Stamping.

The large number of orders which are being constantly received, afford a most satisfactory proof of the opinion of our customers, on the production in this branch of the trade.

Copper-plate Printing.

Visiting, Complimentary, Wedding, Invitation, Menu and Band Programme Cards, Book-plates, Crests, &c., printed in best style.

Die Sinking.

Dies sunk by first-class Artists in the newest and most fashionable style: Crests, Arms, Badges, Monograms, Mottoes, and Addresses. All Regimental Dies kept in stock.

Travellers sent to any Regiment in England, if desired.

PRINTING.

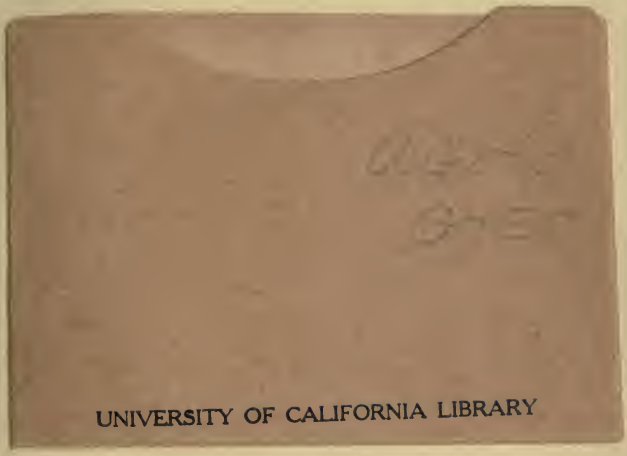
Brompton Works now being one of the Larges Steam Printing Factories in England, we undertak to print all kinds of work, from a Door Card to copy of the Queen's Regulations.

We have lately published the complet Standing Orders of the following Regiments:— 20th Hussars; Middlesex Regt.; 2nd West I. Regt. E. York. Regt.; Bedford Regt.; Connaught Rangers Essex Regt.; Coldstream Guards; Seaforth High. Royal Irish Rifles; Berkshire Regt.; Dorset Regt. Leicester Regt.; York. Regt; Royal Irish Fusiliers Northampton Regt; Worcester Regt.; Suffolk Regt. W. York Regt.; Sherwood Foresters; 11th Bn (Soudanese) Egyptian Army, and many others.

Also the Historical Records of the 44th, The Eas Essex Regt.; 89th, The Royal Irish Fusiliers; an 6th Dragoon Guards (Carabiniers).

They are pronounced to be the best that have eve been published, both for the high-class style o Printing, &c., and excellent Binding, for which the are universally admired.

We shall have pleasure in sending specime copies for inspection to any customer desirous o seeing them.

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